

State of Colorado  
**Oil and Gas Conservation Commission**

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



FOR OGCC USE ONLY

**RECEIVED**  
**8/23/2013**

**SPILL/RELEASE REPORT**

This form is to be submitted by the party responsible for the oil and gas spill or release. Any spill or release which may impact waters of the State must be reported as soon as practicable; any spill over 20 bbls must be reported within 24 hours and all spills over five bbls must be reported within ten days. Submit a Site Investigation and Remediation Workplan (Form 27) when requested by the Director.

Spill report taken by:

FACILITY ID:  
335897

**OPERATOR INFORMATION**

Name of Operator: _____ OGCC Operator No: _____	Phone Numbers No: _____ Fax: _____ E-Mail: _____
Address: _____	
City: _____ State: _____ Zip: _____	
Contact Person: _____	

**DESCRIPTION OF SPILL OR RELEASE**

Date of Incident: _____ Facility Name & No.: _____	County: _____
Type of Facility (well, tank battery, flow line, pit): _____	QtrQtr: _____ Section: _____
Well Name and Number: _____	Township: _____ Range: _____
API Number: _____	Meridian: _____
Specify volume spilled and recovered (in bbls) for the following materials: Oil spilled: _____ Oil recov'd: _____ Water spilled: _____ Water recov'd: _____ Other spilled: _____ Other recov'd: _____	
Ground Water impacted? Yes No	Surface Water impacted? Yes No
Contained within berm? Yes No	Area and vertical extent of spill: _____x_____
Current land use: _____ Weather conditions: _____	
Soil/geology description: _____	
<b>IF LESS THAN A MILE</b> , report distance <b>IN FEET</b> to nearest.... Surface water: _____ wetlands: _____ buildings: _____	
Livestock: _____ water wells: _____ Depth to shallowest ground water: _____	
Cause of spill (e.g., equipment failure, human error, etc.): _____ Detailed description of the spill/release incident: _____	

**CORRECTIVE ACTION**

Describe immediate response (how stopped, contained and recovered):

Describe any emergency pits constructed:

How was the extent of contamination determined:

Further remediation activities proposed (attach separate sheet if needed):

Describe measures taken to prevent problem from reoccurring:

**OTHER NOTIFICATIONS**

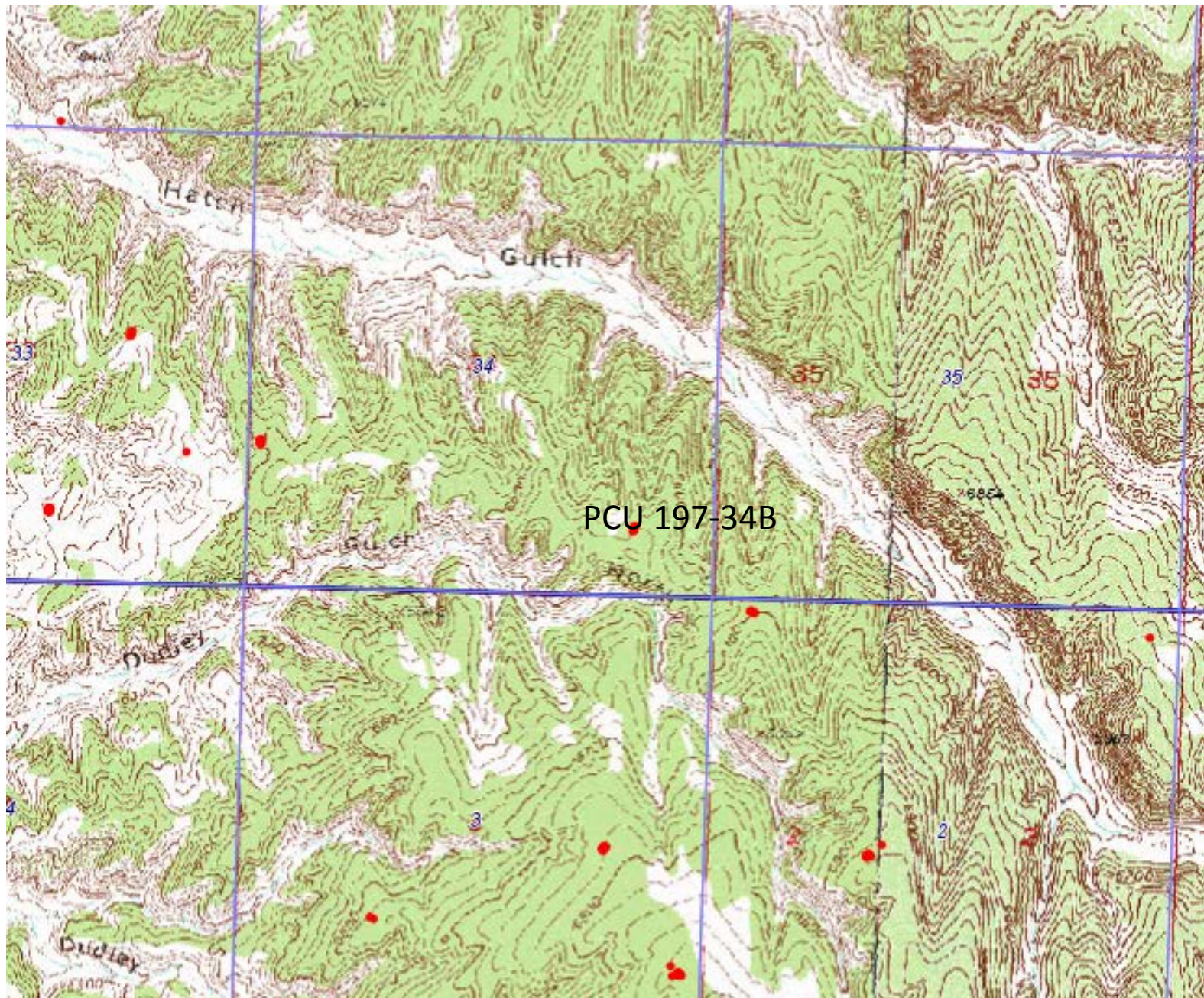
List the parties and agencies notified (County, BLM, EPA, DOT, Local Emergency Planning Coordinator or other).

Date	Agency	Contact	Phone	Response

Spill/Release Tracking No: **2147030**



## PCU 197-34B



## **ATTACHMENT I**

### **PCU 197-34B Chemical Spill**

#### **Initial Actions Taken:**

Impacted soils were excavated and stored in a temporary lined secondary containment for offsite disposal at an approved disposal facility. A confirmation Table 910-1 composite soil sample was collected from the excavation area, results are below Table 910-1 standards with the exception of pH (9.15) and Arsenic (5.9 mg/kg). The Arsenic is within allowable background concentrations, please see below.

The excavation will be backfilled with clean onsite material.

XTO herein requests No Further Action for this spill.

#### **Background Arsenic:**

XTO Energy herein requests consideration of site-specific background Arsenic levels as an alternative to the Table 910-1 value for the PCU 297-10B location. COGCC Table 910-1 Concentration Levels list the allowable concentration level for Arsenic in soil at 0.39 mg/kg. Footnote 1 of Table 910-1 states "Consideration shall be given to background levels in native soils and ground water". At other locations COGCC has allowed the determination of allowable levels based upon a 10% variability factor applied to background soil concentration values where the maximum allowable level is computed by multiplying the highest detected background concentration by 1.1.

- Eight representative background samples were collected from undisturbed areas adjacent to the subject location. Arsenic concentrations in those samples ranged from 3.7 mg/kg to 7.9 mg/kg. Applying the 10% variability factor to the highest concentration detected results in an allowable Arsenic concentration level of 8.7 mg/kg.

Please find the Lab Data Summary Table, Site Map indicating Arsenic sampling locations and Lab Report D49492 attached.



**Table 1**  
**Location: PCU 197-34B**  
**Lab Summary - Chemical Spill**

Last update 8/23/2013

Analytical Parameter (with units)	Spill Confirmation (8/14/13)	Background								COGCC Table 910-1 Concentration Levels	Maximum based on Background
		#1	#2	#3	#4	#5	#6	#7	#8		
Accutest Job #	D49492	D20678 (1/24/11)				D37194 (8/2/12)				-	-
Sample type (Composite/Discrete)	C	D	D	D	D	D	D	D	D	-	-
TPH (GRO) (mg/Kg)	ND	-	-	-	-	-	-	-	-	-	-
TPH (DRO) (mg/Kg)	53.2	-	-	-	-	-	-	-	-	-	-
TPH (GRO + DRO) (mg/Kg)	53.2	-	-	-	-	-	-	-	-	500	-
Benzene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.170	-
Toluene (mg/Kg)	ND	-	-	-	-	-	-	-	-	85	-
Ethylbenzene (mg/Kg)	ND	-	-	-	-	-	-	-	-	100	-
Xylenes (total) (mg/Kg)	ND	-	-	-	-	-	-	-	-	175	-
Acenaphthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.22	-
Benzo(B)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	2.2	-
Benzo(A)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.022	-
Chrysene (mg/Kg)	ND	-	-	-	-	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Fluorene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	0.22	-
Naphthalene (mg/Kg)	ND	-	-	-	-	-	-	-	-	23	-
Pyrene (mg/Kg)	ND	-	-	-	-	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)	1.260	-	-	-	-	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)	8.30	-	-	-	-	-	-	-	-	12	-
pH	9.15	-	-	-	-	-	-	-	-	6-9	-
Arsenic (mg/kg)	5.9	4.3	3.9	5.1	3.7	6.4	7.9	6.8	5.7	0.39	8.7
Barium (mg/kg)	2680	-	-	-	-	-	-	-	-	15000	-
Cadmium (mg/kg)	<1.1	-	-	-	-	-	-	-	-	70	-
Chromium (III) (mg/Kg)	35.3	-	-	-	-	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)	<1.0	-	-	-	-	-	-	-	-	23	-
Copper (mg/kg)	15.9	-	-	-	-	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)	8.9	-	-	-	-	-	-	-	-	400	-
Mercury (mg/kg)	<0.090	-	-	-	-	-	-	-	-	23	-
Nickel (mg/kg)	21.4	-	-	-	-	-	-	-	-	1600	-
Selenium (mg/kg)	<5.5	-	-	-	-	-	-	-	-	390	-
Silver (mg/kg)	<3.3	-	-	-	-	-	-	-	-	390	-
Zinc (mg/kg)	40.8	-	-	-	-	-	-	-	-	23000	-
% Solids	91.5	81.3	82.7	78.6	74.5	81.9	90.2	92.6	90.2	-	-

Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.

LEGEND	
---	EDGE OF PAD
-.-.-	PIT / TRENCH
- - - -	BERM / WEIR
∞	WELL HEAD
⊗ BG 5	BACKGROUND SAMPLE LOCATION
●	SUBLINER SAMPLE LOCATION

- NOTES:
1. BACKGROUND ARSENIC RESULTS ARE DISCRETE SAMPLES.
  2. ND INDICATES NOT DETECTED WITHIN LABORATORY DETECTION LIMITS.

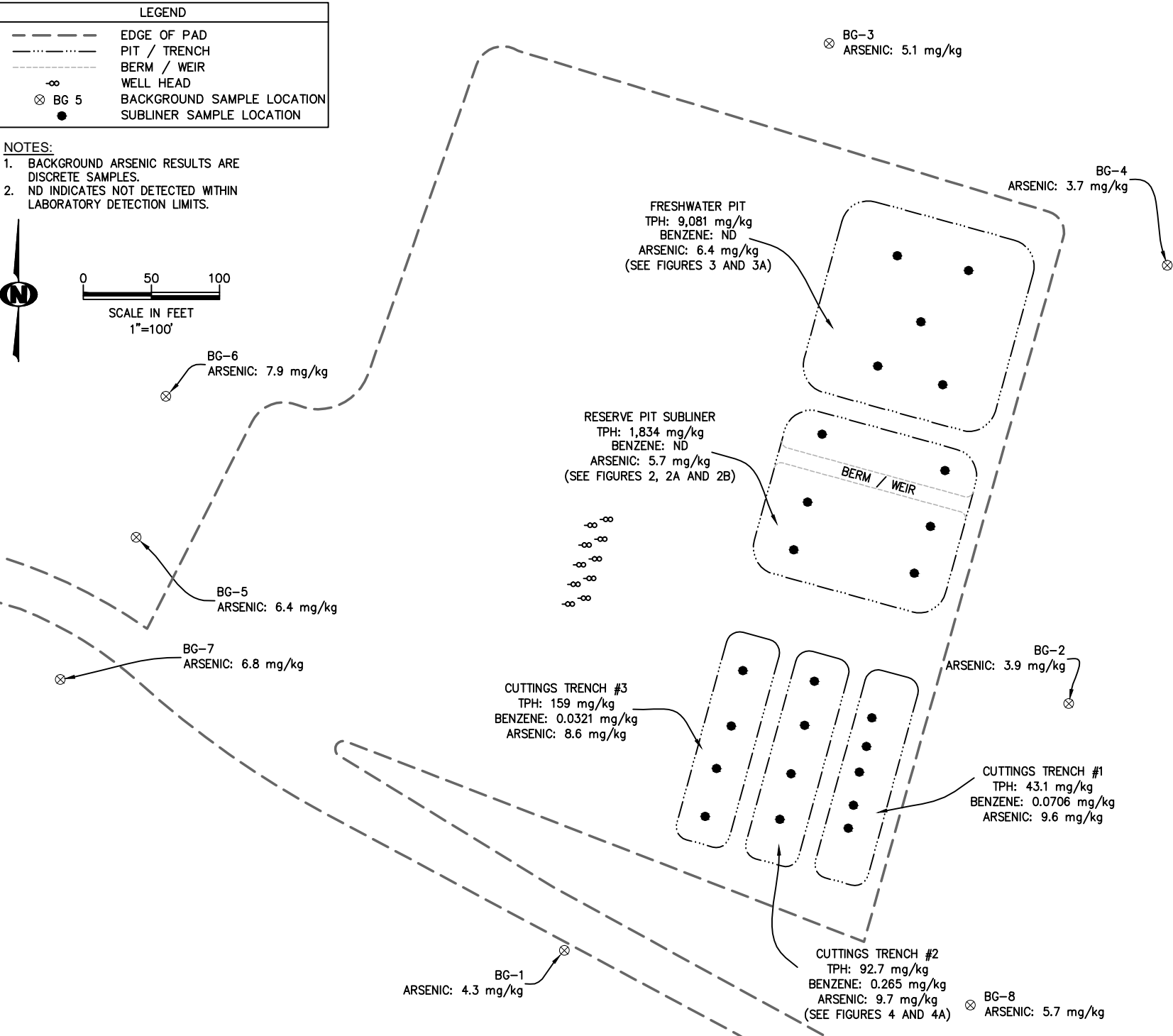
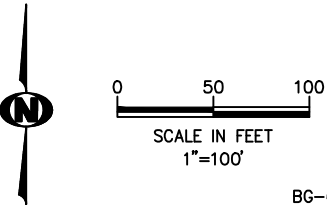


FIGURE 1

PICEANCE CREEK  
PCU 197-34B  
SAMPLE LOCATIONS WITH  
SELECT RESULTS  
PREPARED FOR XTO ENERGY

KRW CONSULTING, INC.  
8000 W. 14TH AVENUE, SUITE 200  
LAKEWOOD, COLORADO  
(303) 239-9011

NOTES:

FIGURE

1

CHECKED:

DK

DESIGNED:

-

DRAWN:

MRH

DATE:

10/1/12

FILE NAME:

samples

SHEET NO.

1 of 8

SCALE:

1"=100'

PROJECT NO.

1101-04A

DATE

REVISIONS



08/22/13

## Technical Report for

**XTO Energy**

**PCU 197-34B**

**1101-04 Table 910 Confirmation**

**Accutest Job Number: D49492**

**Sampling Date: 08/14/13**

### Report to:

KRW Consulting, Inc.  
8000 West 14th Avenue  
Lakewood, CO 80214  
dknudson@krwconsulting.com; jhess@krwconsulting.com;  
crachak@krwconsulting.com; rrasnic@krwconsulting.com;  
ATTN: Dwayne Knudson

**Total number of pages in report: 138**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

A handwritten signature in black ink, appearing to read 'Scott Heideman'.

**Scott Heideman**  
**Laboratory Director**

**Client Service contact: Renea Jackson 303-425-6021**

Certifications: CO (CO00049), ID, NE (CO00049), ND (R-027), NJ (CO 0007), OK (D9942), UT (NELAP CO00049), TX (T104704511)

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.  
Test results relate only to samples analyzed.

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Sample Summary

XTO Energy

Job No: D49492

PCU 197-34B

Project No: 1101-04 Table 910 Confirmation

Sample Number	Collected		Time By	Received	Matrix		Client Sample ID
	Date				Code	Type	
D49492-1	08/14/13	14:10	JD	08/16/13	SO	Soil	TABLE 910 CONFIRMATION
D49492-1A	08/14/13	14:10	JD	08/16/13	SO	Soil	TABLE 910 CONFIRMATION

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

## CASE NARRATIVE / CONFORMANCE SUMMARY

**Client:** XTO Energy

**Job No** D49492

**Site:** PCU 197-34B

**Report Date** 8/22/2013 9:33:43 AM

On 08/16/2013, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 4 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D49492 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

### Volatiles by GCMS By Method SW846 8260B

**Matrix:** SO

**Batch ID:** V5V1727

- All samples were analyzed within the recommended method holding time.
- Sample(s) D49493-1MS, D49493-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

### Extractables by GCMS By Method SW846 8270C BY SIM

**Matrix:** SO

**Batch ID:** OP8392

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D49242-6MS, D49242-6MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- The matrix spike duplicate (MSD) recovery(s) of Naphthalene are outside control limits. Probable cause due to matrix interference.
- The RPD(s) for the MS and MSD recoveries of Chrysene are outside control limits for sample OP8392-MSD. Variability of recovery may be due to sample matrix/homogeneity.

### Volatiles by GC By Method SW846 8015B

**Matrix:** SO

**Batch ID:** GGB1195

- All samples were analyzed within the recommended method holding time.
- Sample(s) D49413-1MS, D49413-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

### Extractables by GC By Method SW846-8015B

**Matrix:** SO

**Batch ID:** OP8393

- All samples were extracted and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D49462-6BMS, D49462-6BMSD were used as the QC samples indicated.
- The matrix spike (MS) recovery(s) of TPH-DRO (C10-C28) are outside control limits. Outside control limits due to high level in sample relative to spike amount.

## Metals By Method SW846 6010C

**Matrix:** AQ

**Batch ID:** MP10866

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D49462-6AMS, D49462-6AMSD, D49462-6ASDL were used as the QC samples for the metals analysis.

**Matrix:** SO

**Batch ID:** MP10861

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D49492-1SDL, D49492-1MS, D49492-1SDL, D49492-1MSD were used as the QC samples for the metals analysis.
- The matrix spike (MS) recovery(s) of Barium are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
- The RPD(s) for the MS and MSD recoveries of Barium are outside control limits for sample MP10861-S2. High RPD due to possible sample matrix or nonhomogeneity.
- The serial dilution RPD(s) for Silver are outside control limits for sample MP10861-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- MP10861-SD1 for Nickel, Zinc: Serial dilution indicates possible matrix interference.

## Metals By Method SW846 6020A

**Matrix:** SO

**Batch ID:** MP10862

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D49492-1MS, D49492-1MSD, D49492-1SDL were used as the QC samples for the metals analysis.

## Metals By Method SW846 7471B

**Matrix:** SO

**Batch ID:** MP10858

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D49492-1MS, D49492-1MSD were used as the QC samples for the metals analysis.

## Wet Chemistry By Method ASTM D1498-76M

**Matrix:** SO

**Batch ID:** GN21520

- Sample(s) D49242-4DUP were used as the QC samples for the Redox Potential Vs H2 analysis.

## Wet Chemistry By Method SM2540B-2011 M

**Matrix:** SO

**Batch ID:** GN21533

- The data for SM2540B-2011 M meets quality control requirements.

## Wet Chemistry By Method SW846 3060A/7196A

**Matrix:** SO

**Batch ID:** GP10718

- All samples were prepared and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D49492-1MS, D49492-1MSD, D49492-1DUP were used as the QC samples for the Chromium, Hexavalent analysis.
- The duplicate RPD(s) for Chromium, Hexavalent are outside control limits for sample GP10718-D1. RPD acceptable due to low duplicate and sample concentrations.

### Wet Chemistry By Method SW846 3060A/7196A M

**Matrix:** SO

**Batch ID:** R18402

- The data for SW846 3060A/7196A M meets quality control requirements.
- D49492-1 for Chromium, Trivalent: Calculated as: (Chromium) - (Chromium, Hexavalent)

### Wet Chemistry By Method SW846 9045D

**Matrix:** SO

**Batch ID:** GN21530

- The following samples were run outside of holding time for method SW846 9045D: D49492-1

### Wet Chemistry By Method USDA HANDBOOK 60

**Matrix:** SO

**Batch ID:** MP10866

- D49492-1A for Sodium Adsorption Ratio: Calculated as:  $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

## Summary of Hits

Page 1 of 1

**Job Number:** D49492  
**Account:** XTO Energy  
**Project:** PCU 197-34B  
**Collected:** 08/14/13

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
---------------	------------------	-----------------	----	-----	-------	--------

### D49492-1 TABLE 910 CONFIRMATION

TPH-DRO (C10-C28)	53.2	7.3	5.5	mg/kg	SW846-8015B
Arsenic	5.9	0.11		mg/kg	SW846 6020A
Barium	2680	5.5		mg/kg	SW846 6010C
Chromium	35.3	1.1		mg/kg	SW846 6010C
Copper	15.9	1.1		mg/kg	SW846 6010C
Lead	8.9	5.5		mg/kg	SW846 6010C
Nickel	21.4	3.3		mg/kg	SW846 6010C
Zinc	40.8	3.3		mg/kg	SW846 6010C
Specific Conductivity	1260	1.0		umhos/cm	SM 2510B-2011 MOD
Chromium, Trivalent <sup>a</sup>	35.3	2.1		mg/kg	SW846 3060A/7196A M
Redox Potential Vs H2	177			mv	ASTM D1498-76M
pH	9.15			su	SW846 9045D

### D49492-1A TABLE 910 CONFIRMATION

Calcium	25.8	2.0		mg/l	SW846 6010C
Magnesium	10.5	1.0		mg/l	SW846 6010C
Sodium	198	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio <sup>b</sup>	8.30			ratio	USDA HANDBOOK 60

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

(b) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]



Sample Results

Report of Analysis

Accutest Laboratories

## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b>	TABLE 910 CONFIRMATION			<b>Date Sampled:</b>	08/14/13
<b>Lab Sample ID:</b>	D49492-1			<b>Date Received:</b>	08/16/13
<b>Matrix:</b>	SO - Soil			<b>Percent Solids:</b>	91.5
<b>Method:</b>	SW846 8260B				
<b>Project:</b>	PCU 197-34B				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V28692.D	1	08/16/13	BD	n/a	n/a	V5V1727
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.04 g	5.0 ml	100 ul
Run #2			

## Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.059	0.029	mg/kg	
108-88-3	Toluene	ND	0.12	0.059	mg/kg	
100-41-4	Ethylbenzene	ND	0.12	0.022	mg/kg	
1330-20-7	Xylene (total)	ND	0.24	0.12	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	90%		64-130%
460-00-4	4-Bromofluorobenzene	119%		62-131%
17060-07-0	1,2-Dichloroethane-D4	85%		70-130%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Accutest Laboratories

## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b>	TABLE 910 CONFIRMATION			<b>Date Sampled:</b>	08/14/13
<b>Lab Sample ID:</b>	D49492-1			<b>Date Received:</b>	08/16/13
<b>Matrix:</b>	SO - Soil			<b>Percent Solids:</b>	91.5
<b>Method:</b>	SW846 8270C BY SIM SW846 3546				
<b>Project:</b>	PCU 197-34B				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G15952.D	1	08/19/13	DC	08/16/13	OP8392	E3G786
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

## COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	0.0091	0.0047	mg/kg	
120-12-7	Anthracene	ND	0.0091	0.0047	mg/kg	
56-55-3	Benzo(a)anthracene	ND	0.0091	0.0047	mg/kg	
205-99-2	Benzo(b)fluoranthene	ND	0.0091	0.0047	mg/kg	
207-08-9	Benzo(k)fluoranthene	ND	0.0091	0.0047	mg/kg	
50-32-8	Benzo(a)pyrene	ND	0.0091	0.0047	mg/kg	
218-01-9	Chrysene	ND	0.0091	0.0047	mg/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	0.0091	0.0047	mg/kg	
206-44-0	Fluoranthene	ND	0.0091	0.0047	mg/kg	
86-73-7	Fluorene	ND	0.0091	0.0055	mg/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.0091	0.0047	mg/kg	
91-20-3	Naphthalene	ND	0.013	0.011	mg/kg	
129-00-0	Pyrene	ND	0.0091	0.0047	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	58%		10-159%
321-60-8	2-Fluorobiphenyl	71%		19-131%
1718-51-0	Terphenyl-d14	69%		18-150%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Accutest Laboratories

## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b>	TABLE 910 CONFIRMATION				
<b>Lab Sample ID:</b>	D49492-1			<b>Date Sampled:</b>	08/14/13
<b>Matrix:</b>	SO - Soil			<b>Date Received:</b>	08/16/13
<b>Method:</b>	SW846 8015B			<b>Percent Solids:</b>	91.5
<b>Project:</b>	PCU 197-34B				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB21708.D	1	08/16/13	EV	n/a	n/a	GGB1195
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.0 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	12	5.9	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	86%		60-140%		

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

Accutest Laboratories

## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b>	TABLE 910 CONFIRMATION					<b>Date Sampled:</b>	08/14/13
<b>Lab Sample ID:</b>	D49492-1					<b>Date Received:</b>	08/16/13
<b>Matrix:</b>	SO - Soil					<b>Percent Solids:</b>	91.5
<b>Method:</b>	SW846-8015B SW846 3546						
<b>Project:</b>	PCU 197-34B						

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH012151.D	1	08/19/13	TU	08/16/13	OP8393	GFH665
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	53.2	7.3	5.5	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	55%		35-130%		

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound



## Report of Analysis

**Client Sample ID:** TABLE 910 CONFIRMATION**Lab Sample ID:** D49492-1**Matrix:** SO - Soil**Project:** PCU 197-34B**Date Sampled:** 08/14/13**Date Received:** 08/16/13**Percent Solids:** 91.5**Metals Analysis**

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	5.9	0.11	mg/kg	5	08/20/13	08/20/13 JB	SW846 6020A <sup>3</sup>	SW846 3050B <sup>6</sup>
Barium	2680	5.5	mg/kg	5	08/20/13	08/21/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Cadmium	< 1.1	1.1	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Chromium	35.3	1.1	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Copper	15.9	1.1	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Lead	8.9	5.5	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Mercury	< 0.090	0.090	mg/kg	1	08/19/13	08/20/13 JM	SW846 7471B <sup>1</sup>	SW846 7471B <sup>4</sup>
Nickel	21.4	3.3	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Selenium	< 5.5	5.5	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Silver	< 3.3	3.3	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>
Zinc	40.8	3.3	mg/kg	1	08/20/13	08/20/13 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>5</sup>

(1) Instrument QC Batch: MA3890

(2) Instrument QC Batch: MA3891

(3) Instrument QC Batch: MA3892

(4) Prep QC Batch: MP10858

(5) Prep QC Batch: MP10861

(6) Prep QC Batch: MP10862

RL = Reporting Limit

## Report of Analysis

**Client Sample ID:** TABLE 910 CONFIRMATION**Lab Sample ID:** D49492-1**Matrix:** SO - Soil**Project:** PCU 197-34B**Date Sampled:** 08/14/13**Date Received:** 08/16/13**Percent Solids:** 91.5**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
<b>prep: DEPT.OF AG, BOOK N9</b>							
Specific Conductivity	1260	1.0	umhos/cm	1	08/21/13	RW	SM 2510B-2011 MOD
Chromium, Hexavalent	< 1.0	1.0	mg/kg	1	08/19/13	RW	SW846 3060A/7196A
Chromium, Trivalent <sup>a</sup>	35.3	2.1	mg/kg	1	08/20/13 16:43	JB	SW846 3060A/7196A M
Redox Potential Vs H2	177		mv	1	08/16/13	AK	ASTM D1498-76M
Solids, Percent	91.5		%	1	08/19/13	SWT	SM2540B-2011 M
pH	9.15		su	1	08/16/13 14:15	BF	SW846 9045D

(a) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

**Client Sample ID:** TABLE 910 CONFIRMATION  
**Lab Sample ID:** D49492-1A  
**Matrix:** SO - Soil  
**Project:** PCU 197-34B

**Date Sampled:** 08/14/13  
**Date Received:** 08/16/13  
**Percent Solids:** 91.5

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method	Prep Method
Calcium	25.8	2.0	mg/l	1	08/20/13	08/20/13	JB	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Magnesium	10.5	1.0	mg/l	1	08/20/13	08/20/13	JB	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Sodium	198	2.0	mg/l	1	08/20/13	08/20/13	JB	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>

(1) Instrument QC Batch: MA3891  
(2) Prep QC Batch: MP10866

RL = Reporting Limit

4.2  
4

Report of Analysis

<b>Client Sample ID:</b>	TABLE 910 CONFIRMATION	<b>Date Sampled:</b>	08/14/13
<b>Lab Sample ID:</b>	D49492-1A	<b>Date Received:</b>	08/16/13
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	91.5
<b>Project:</b>	PCU 197-34B		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	8.30		ratio	1	08/20/13 19:59	JB	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

## Misc. Forms

5

### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody



**Accutest Laboratories Mountain States**  
4036 Youngfield Street Wheat Ridge, Co 80033  
TEL. 303-425-6021 877-737-4521  
FAX 303-425-6021

[illegible]

## D49492: Chain of Custody

Page 1 of 2

# Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D49492

Client: XTO ENERGY

Immediate Client Services Action Required: No

Date / Time Received: 8/16/2013 12:30:00 PM

No. Coolers: 1

Client Service Action Required at Login: No

Project: PCU 197-34B

Airbill #'s: HD/CO

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	3. COC Present:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Custody Seals Intact:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	4. Smpl Dates/Time OK	<input checked="" type="checkbox"/>		<input type="checkbox"/>

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Cooler temp verification:			Infrared gun
3. Cooler media:			Ice (bag)

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	<input type="checkbox"/>		<input type="checkbox"/>	
2. Trip Blank listed on COC:	<input type="checkbox"/>		<input type="checkbox"/>	
3. Samples preserved properly:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
4. VOCs headspace free:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Container labeling complete:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
3. Sample container label / COC agree:	<input checked="" type="checkbox"/>		<input type="checkbox"/>

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. All containers accounted for:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
3. Condition of sample:			Intact

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
2. Bottles received for unspecified tests	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
3. Sufficient volume rec'd for analysis:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
4. Compositing instructions clear:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Filtering instructions clear:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments

Accutest Laboratories  
V:(303) 425-6021

4036 Youngfield Street  
F: (303) 425-6854

Wheat Ridge, CO  
www.accutest.com

## GC/MS Volatiles

### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

**Method Blank Summary**

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V1727-MB	5V28686.D	1	08/16/13	BD	n/a	n/a	V5V1727

The QC reported here applies to the following samples:

Method: SW846 8260B

D49492-1

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	25	ug/kg	
100-41-4	Ethylbenzene	ND	100	19	ug/kg	
108-88-3	Toluene	ND	100	50	ug/kg	
1330-20-7	Xylene (total)	ND	200	100	ug/kg	

CAS No.	Surrogate Recoveries	Limits
2037-26-5	Toluene-D8	96% 64-130%
460-00-4	4-Bromofluorobenzene	100% 62-131%
17060-07-0	1,2-Dichloroethane-D4	92% 70-130%

## Blank Spike Summary

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V1727-BS	5V28688.D	1	08/16/13	BD	n/a	n/a	V5V1727

The QC reported here applies to the following samples:

Method: SW846 8260B

D49492-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	2500	2380	95	70-130
100-41-4	Ethylbenzene	2500	2770	111	70-130
108-88-3	Toluene	2500	2420	97	70-130
1330-20-7	Xylene (total)	7500	8030	107	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
2037-26-5	Toluene-D8	95%	64-130%
460-00-4	4-Bromofluorobenzene	114%	62-131%
17060-07-0	1,2-Dichloroethane-D4	86%	70-130%

\* = Outside of Control Limits.



# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D49493-1MS	5V28690.D	1	08/16/13	BD	n/a	n/a	V5V1727
D49493-1MSD	5V28691.D	1	08/16/13	BD	n/a	n/a	V5V1727
D49493-1	5V28689.D	1	08/16/13	BD	n/a	n/a	V5V1727

The QC reported here applies to the following samples:

Method: SW846 8260B

D49492-1

CAS No.	Compound	D49493-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		3310	3050	92	3210	97	5	64-139/30
100-41-4	Ethylbenzene	37.7	J	3310	3340	100	3580	107	7	68-136/30
108-88-3	Toluene	99.9	J	3310	2810	82	2990	87	6	60-130/30
1330-20-7	Xylene (total)	ND		9930	9930	100	10500	106	6	58-142/30

CAS No.	Surrogate Recoveries	MS	MSD	D49493-1	Limits
2037-26-5	Toluene-D8	90%	90%	91%	64-130%
460-00-4	4-Bromofluorobenzene	120%	120%	118%	62-131%
17060-07-0	1,2-Dichloroethane-D4	84%	82%	86%	70-130%

\* = Outside of Control Limits.

GC/MS Volatiles

Raw Data

7

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081613.S\  
Data File : 5V28692.D  
Acq On : 16 Aug 2013 4:37 pm  
Operator : BRETD  
Sample : D49492-1  
Misc : MS6222,V5V1727,5.041,,100,5,1  
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Aug 19 08:42:10 2013  
Quant Method : C:\msdchem\1\METHODS\V5AP1704TVH1704.M  
Quant Title : 8260  
QLast Update : Tue Jul 23 11:00:25 2013  
Response via : Initial Calibration

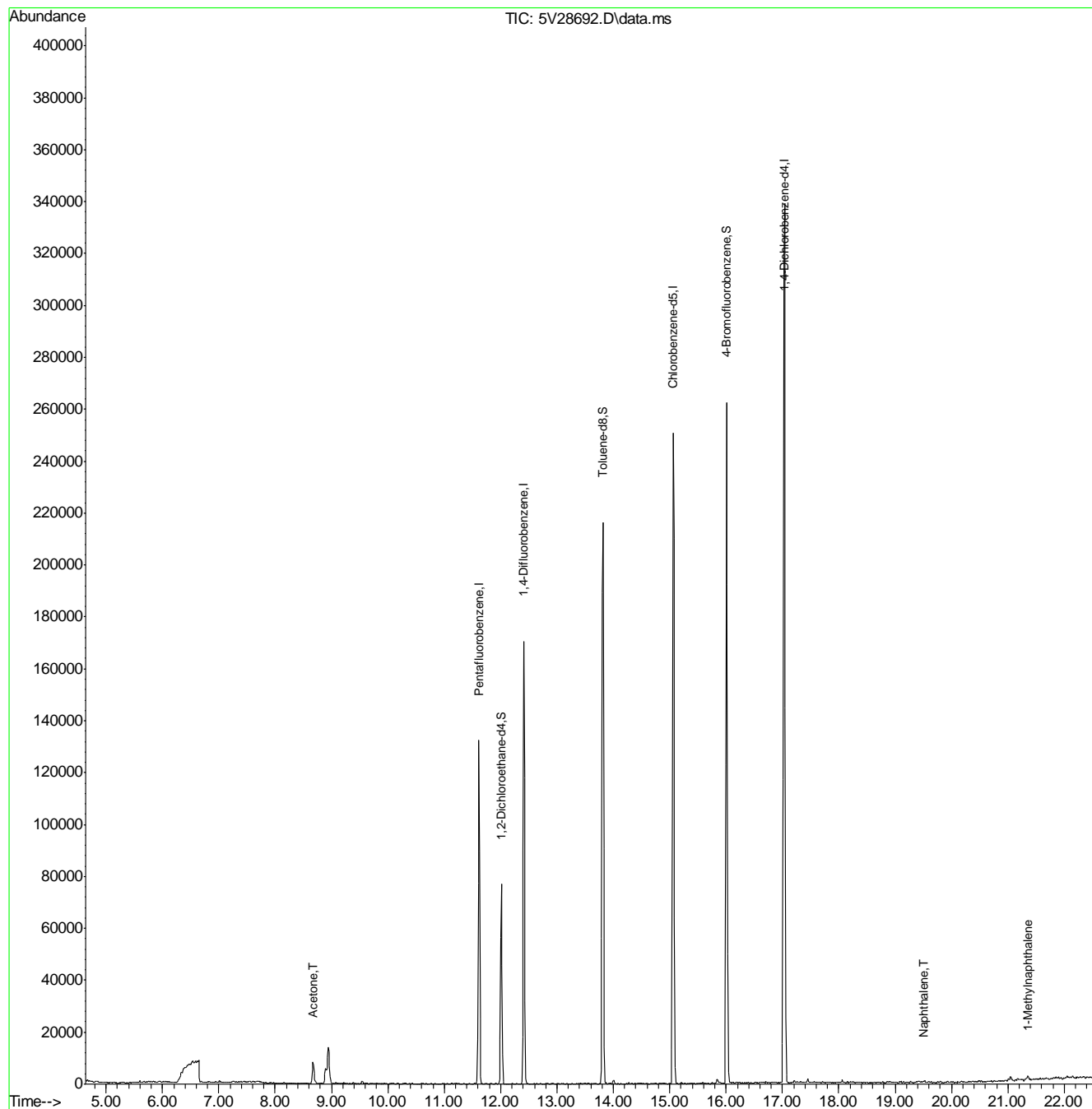
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
2) Pentafluorobenzene	11.613	168	78059	50.00	ug/l	0.00
37) 1,4-Difluorobenzene	12.412	114	106490	50.00	ug/l	0.00
56) Chlorobenzene-d5	15.061	117	122040	50.00	ug/l	0.00
77) 1,4-Dichlorobenzene-d4	17.036	152	104608	50.00	ug/l	0.01
System Monitoring Compounds						
35) 1,2-Dichloroethane-d4	12.012	102	6717	42.57	ug/l	0.00
Spiked Amount	50.000	Range 70 - 130	Recovery	=	85.14%	
64) Toluene-d8	13.816	98	122357	44.94	ug/l	0.00
Spiked Amount	50.000	Range 70 - 130	Recovery	=	89.88%	
72) 4-Bromofluorobenzene	16.008	95	76534	59.31	ug/l	0.00
Spiked Amount	50.000	Range 70 - 130	Recovery	=	118.62%	
Target Compounds						
15) Acetone	8.667	58	3115	29.06	ug/l	Qvalue # 66
94) Naphthalene	19.513	128	1243	0.98	ug/l	100
98) 1-Methylnaphthalene	21.351	142	811	4.04	ug/l	83

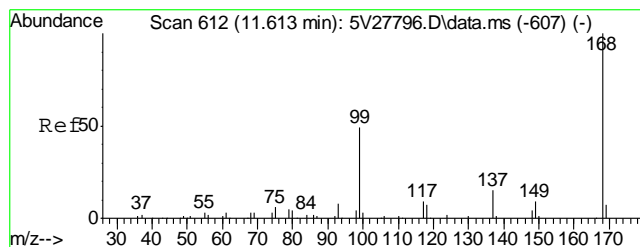
(#) = qualifier out of range (m) = manual integration (+) = signals summed

## Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081613.S\  
Data File : 5V28692.D  
Acq On : 16 Aug 2013 4:37 pm  
Operator : BRETD  
Sample : D49492-1  
Misc : MS6222,V5V1727,5.041,,100,5,1  
ALS Vial : 10 Sample Multiplier: 1

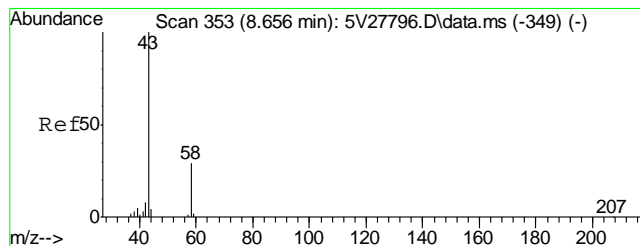
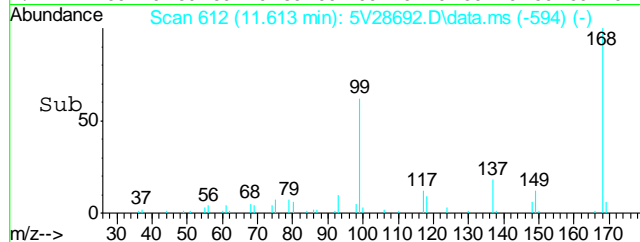
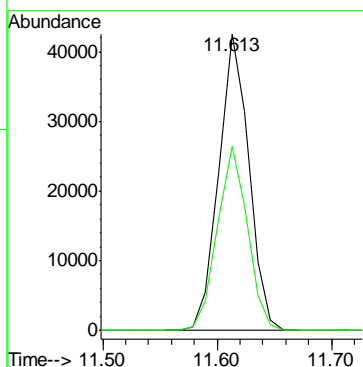
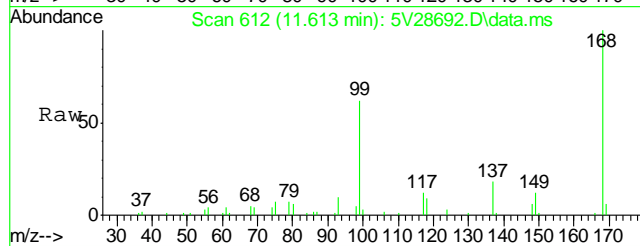
Quant Time: Aug 19 08:42:10 2013  
Quant Method : C:\msdchem\1\METHODS\V5AP1704TVH1704.M  
Quant Title : 8260  
QLast Update : Tue Jul 23 11:00:25 2013  
Response via : Initial Calibration





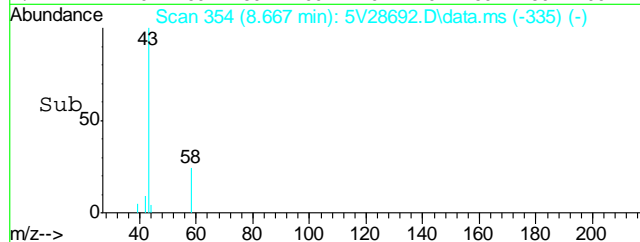
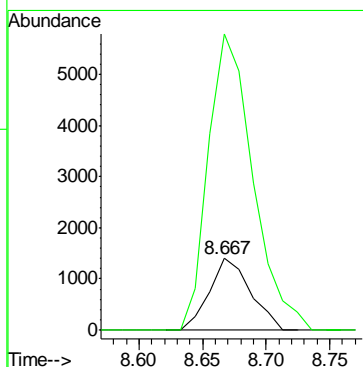
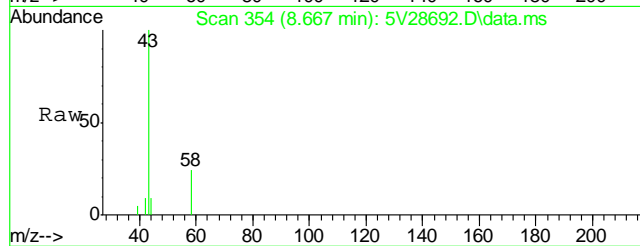
#2  
Pentafluorobenzene  
Concen: 50.00 ug/l  
RT: 11.613 min Scan# 612  
Delta R.T. -0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

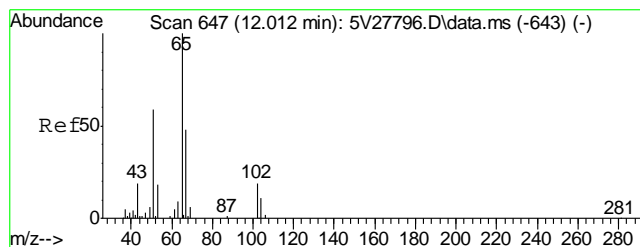
Tgt Ion	Ratio	Lower	Upper
168	100		
99	62.1	41.4	62.2



#15  
Acetone  
Concen: 29.06 ug/l  
RT: 8.667 min Scan# 354  
Delta R.T. 0.012 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

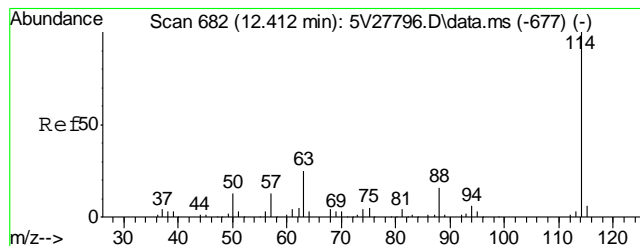
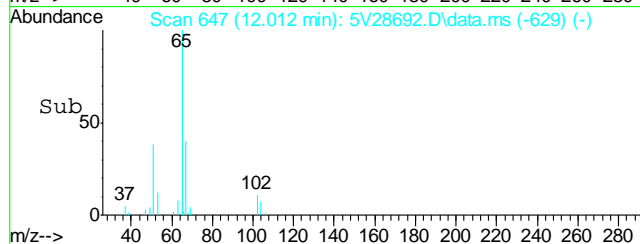
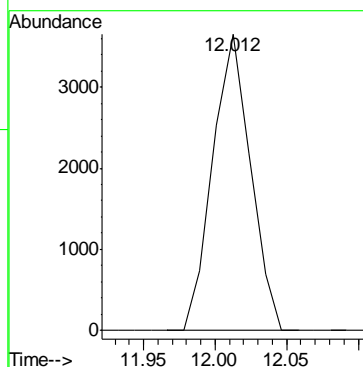
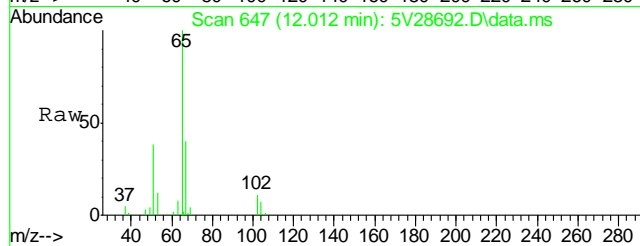
Tgt Ion	Ratio	Lower	Upper
58	100		
43	452.6	355.9	395.9#





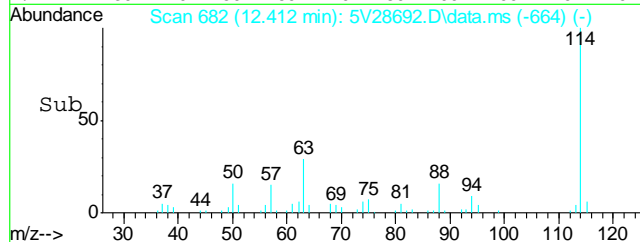
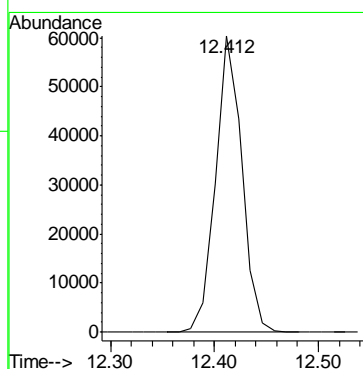
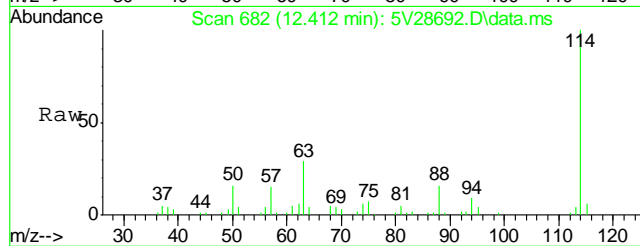
#35  
1,2-Dichloroethane-d4  
Concen: 42.57 ug/l  
RT: 12.012 min Scan# 647  
Delta R.T. -0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

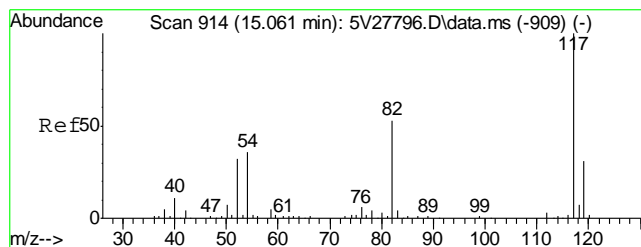
Tgt Ion:102 Resp: 6717



#37  
1,4-Difluorobenzene  
Concen: 50.00 ug/l  
RT: 12.412 min Scan# 682  
Delta R.T. -0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

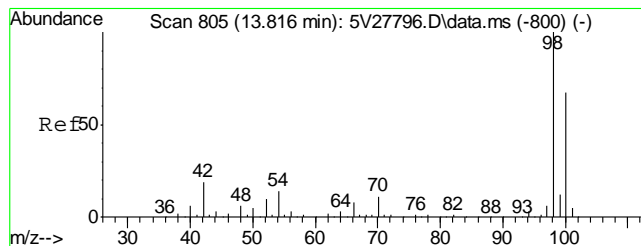
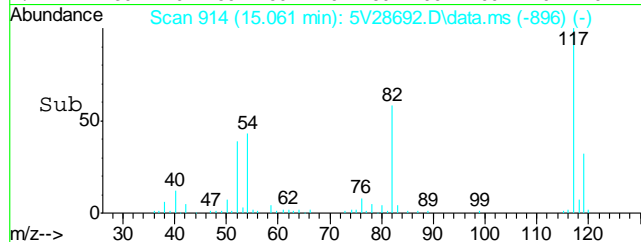
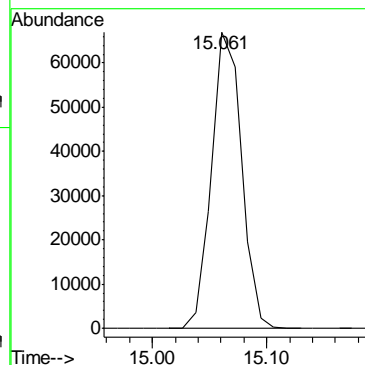
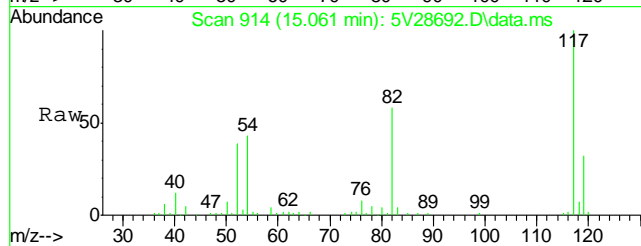
Tgt Ion:114 Resp: 106490





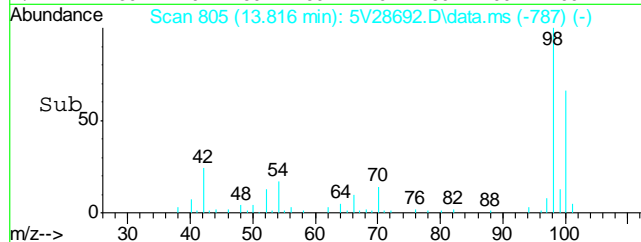
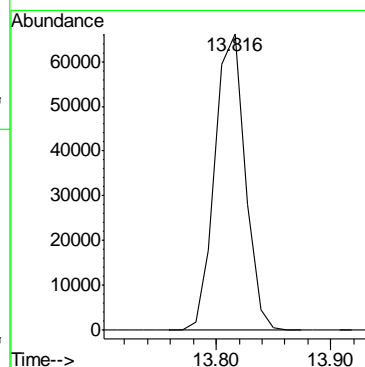
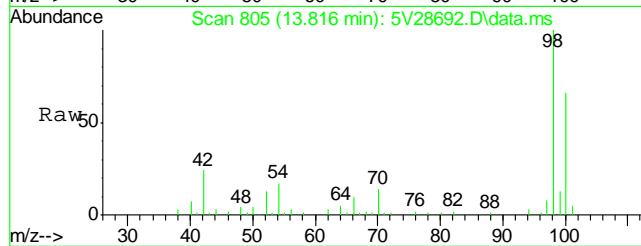
#56  
Chlorobenzene-d5  
Concen: 50.00 ug/l  
RT: 15.061 min Scan# 914  
Delta R.T. -0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

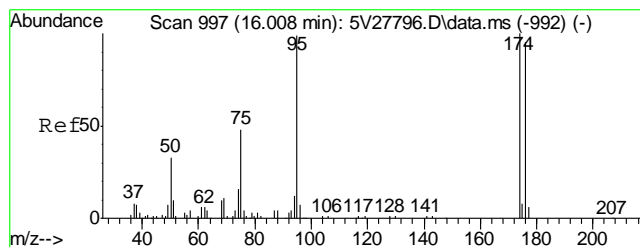
Tgt Ion: 117 Resp: 122040



#64  
Toluene-d8  
Concen: 44.94 ug/l  
RT: 13.816 min Scan# 805  
Delta R.T. -0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

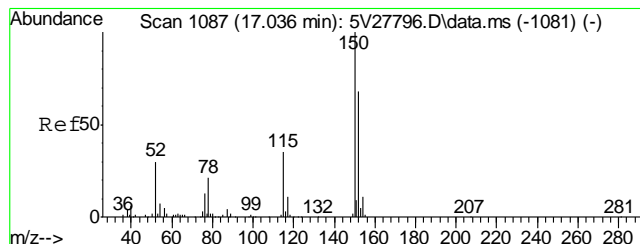
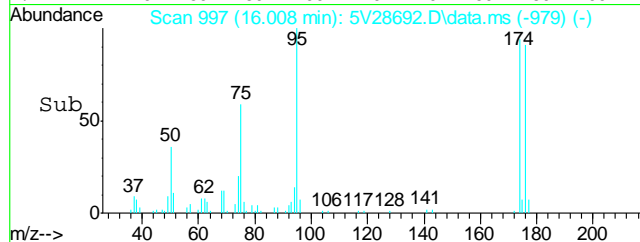
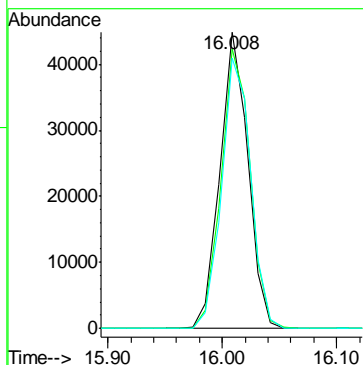
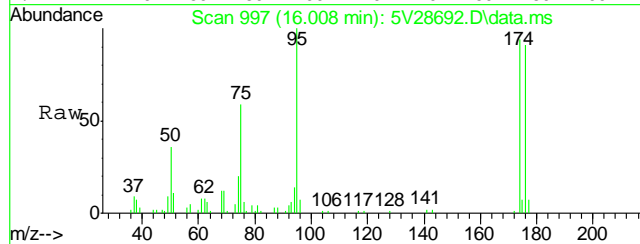
Tgt Ion: 98 Resp: 122357





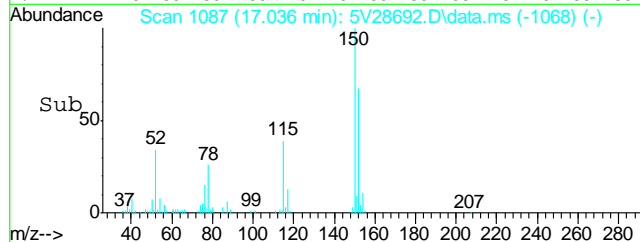
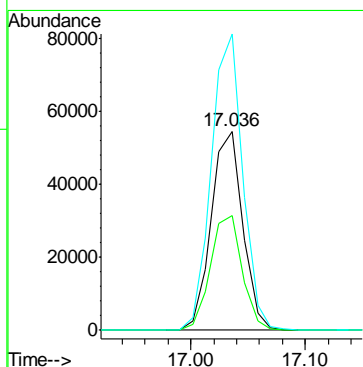
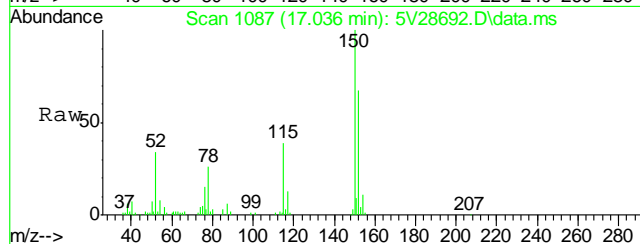
#72  
4-Bromofluorobenzene  
Concen: 59.31 ug/l  
RT: 16.008 min Scan# 997  
Delta R.T. -0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

Tgt Ion	Ratio	Lower	Upper
95	100		
174	98.2	85.4	125.4
176	94.8	80.6	120.6

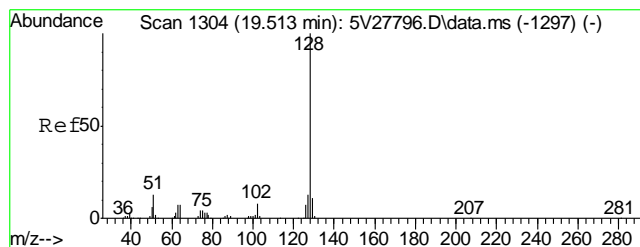


#77  
1,4-Dichlorobenzene-d4  
Concen: 50.00 ug/l  
RT: 17.036 min Scan# 1087  
Delta R.T. 0.011 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

Tgt Ion	Ratio	Lower	Upper
152	100		
115	58.1	43.4	65.2
150	148.3	142.9	214.3

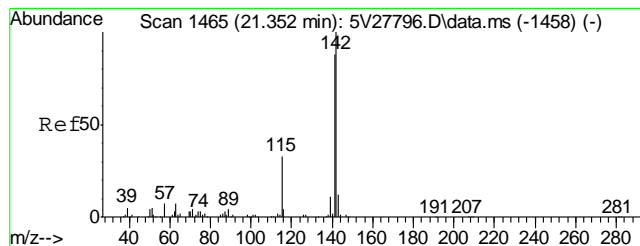
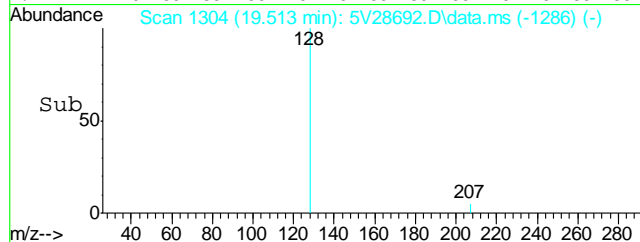
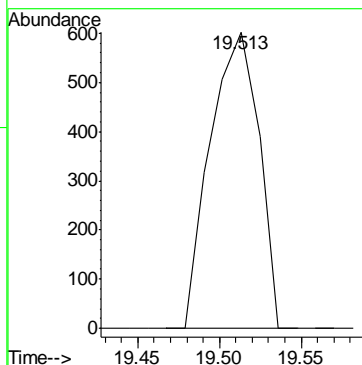
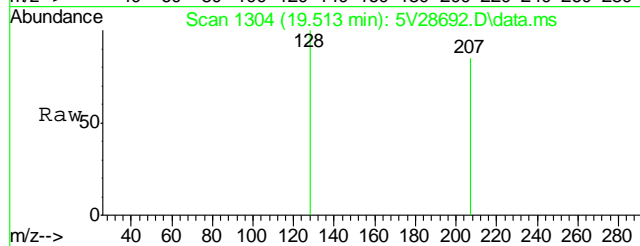






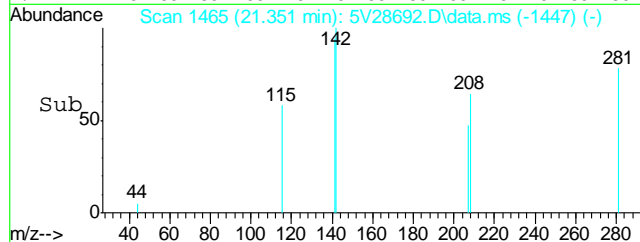
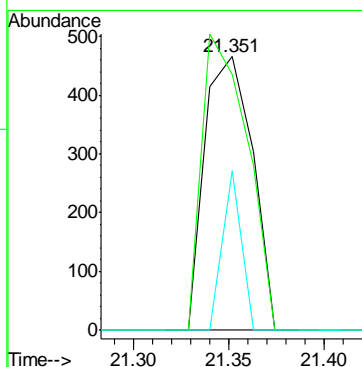
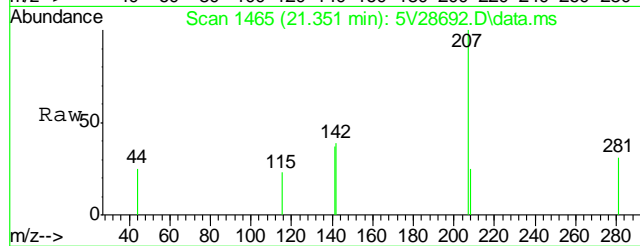
#94  
Naphthalene  
Concen: 0.98 ug/l  
RT: 19.513 min Scan# 1304  
Delta R.T. 0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

Tgt Ion:128 Resp: 1243



#98  
1-Methylnaphthalene  
Concen: 4.04 ug/l  
RT: 21.351 min Scan# 1465  
Delta R.T. 0.000 min  
Lab File: 5V28692.D  
Acq: 16 Aug 2013 4:37 pm

Tgt Ion:142 Resp: 811  
Ion Ratio Lower Upper  
142 100  
141 103.0 68.1 108.1  
115 22.9 13.1 53.1



## Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081613.S\  
Data File : 5V28686.D  
Acq On : 16 Aug 2013 12:20 pm  
Operator : BRETD  
Sample : MB  
Misc : MS6222,V5V1727,5.000,,100,5,1  
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Aug 19 08:34:26 2013  
Quant Method : C:\msdchem\1\METHODS\V5AP1704TVH1704.M  
Quant Title : 8260  
QLast Update : Tue Jul 23 11:00:25 2013  
Response via : Initial Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
2) Pentafluorobenzene	11.613	168	88238	50.00	ug/l	0.00
37) 1,4-Difluorobenzene	12.412	114	124367	50.00	ug/l	0.00
56) Chlorobenzene-d5	15.061	117	136460	50.00	ug/l	0.00
77) 1,4-Dichlorobenzene-d4	17.024	152	104852	50.00	ug/l	0.00

## System Monitoring Compounds

35) 1,2-Dichloroethane-d4	12.012	102	8229	46.14	ug/l	0.00
Spiked Amount	50.000	Range	70 - 130	Recovery	=	92.28%
64) Toluene-d8	13.816	98	146109	47.99	ug/l	0.00
Spiked Amount	50.000	Range	70 - 130	Recovery	=	95.98%
72) 4-Bromofluorobenzene	16.008	95	72470	50.23	ug/l	0.00
Spiked Amount	50.000	Range	70 - 130	Recovery	=	100.46%

## Target Compounds

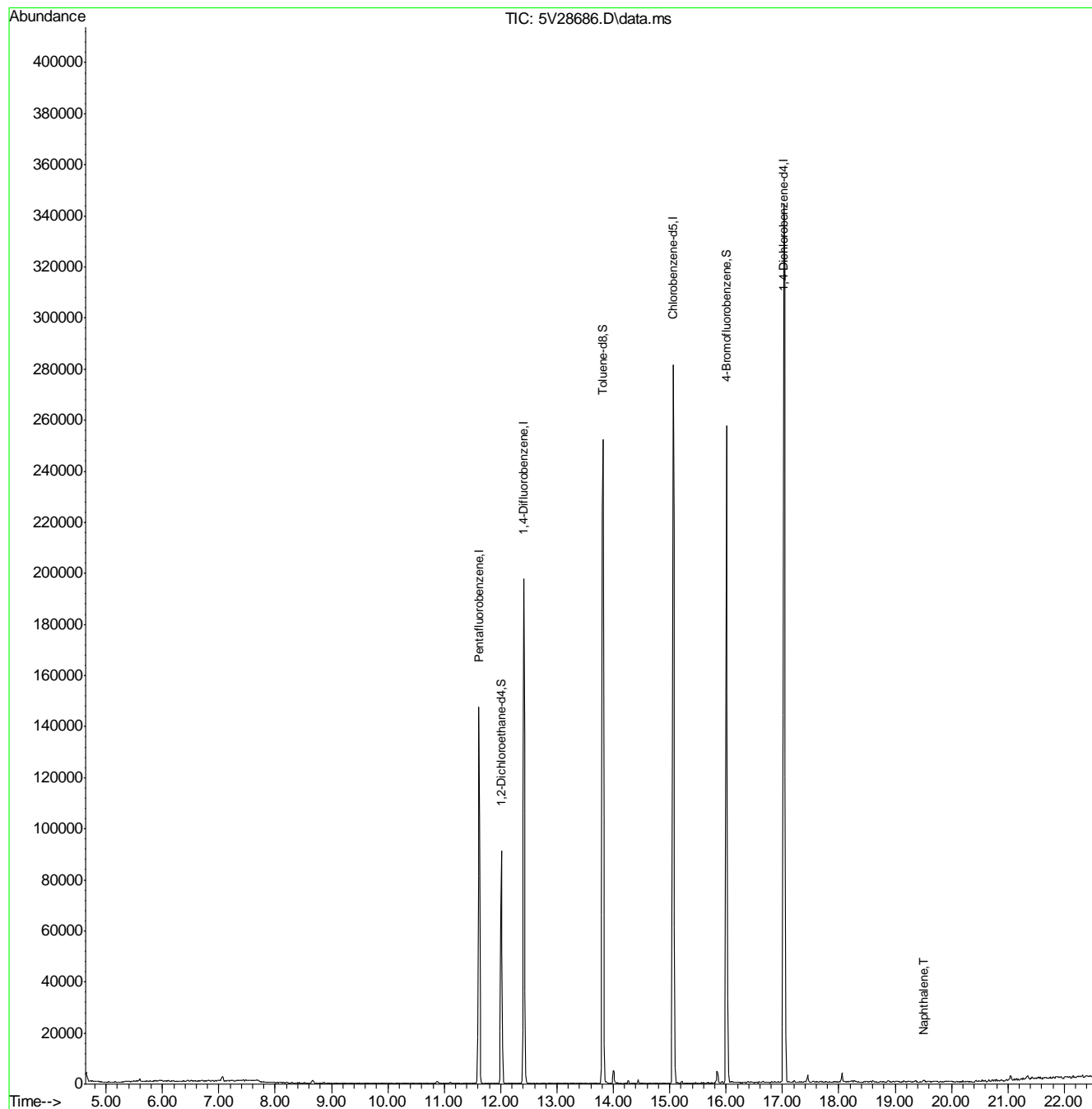
					Qvalue
94) Naphthalene	19.513	128	1189	0.96	ug/l 100

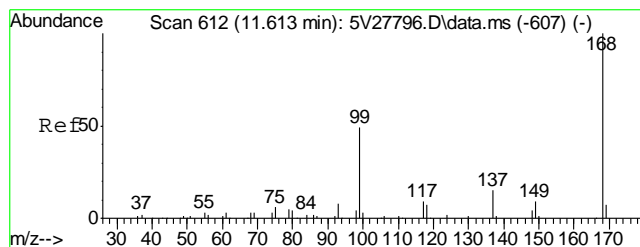
(#) = qualifier out of range (m) = manual integration (+) = signals summed

## Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081613.S\  
Data File : 5V28686.D  
Acq On : 16 Aug 2013 12:20 pm  
Operator : BRETD  
Sample : MB  
Misc : MS6222,V5V1727,5.000,,100,5,1  
ALS Vial : 4 Sample Multiplier: 1

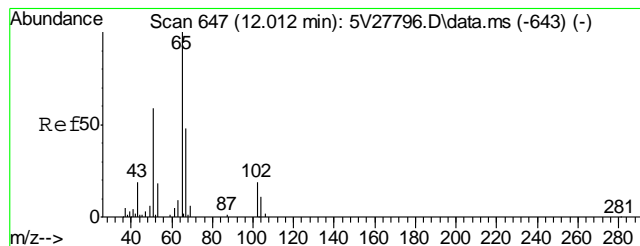
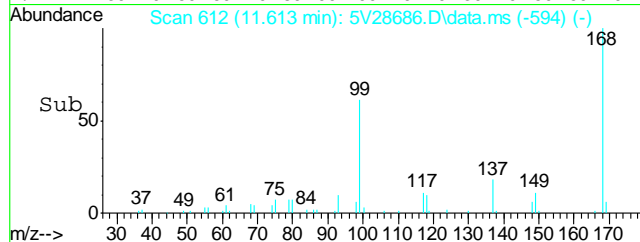
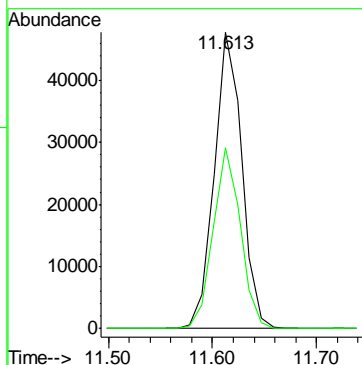
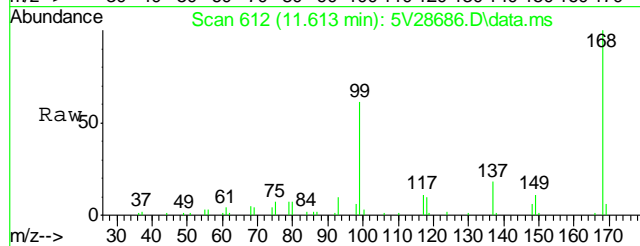
Quant Time: Aug 19 08:34:26 2013  
Quant Method : C:\msdchem\1\METHODS\V5AP1704TVH1704.M  
Quant Title : 8260  
QLast Update : Tue Jul 23 11:00:25 2013  
Response via : Initial Calibration





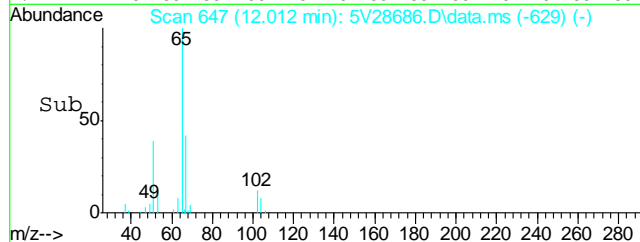
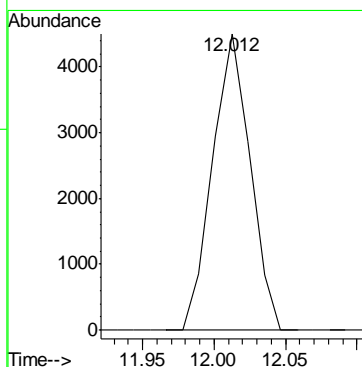
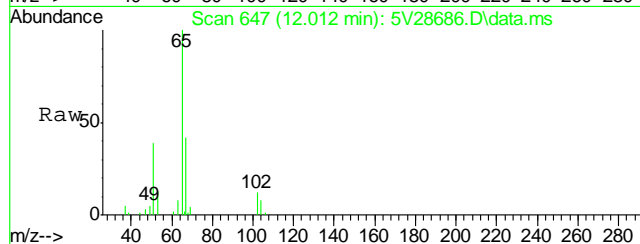
#2  
Pentafluorobenzene  
Concen: 50.00 ug/l  
RT: 11.613 min Scan# 612  
Delta R.T. -0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

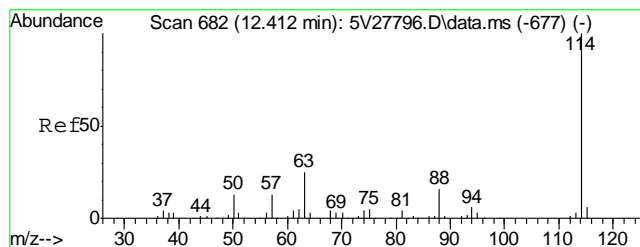
Tgt Ion:168 Resp: 88238  
Ion Ratio Lower Upper  
168 100  
99 60.4 41.4 62.2



#35  
1,2-Dichloroethane-d4  
Concen: 46.14 ug/l  
RT: 12.012 min Scan# 647  
Delta R.T. -0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

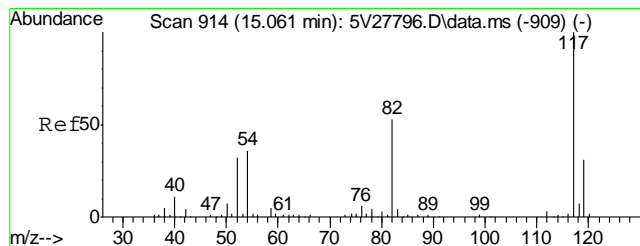
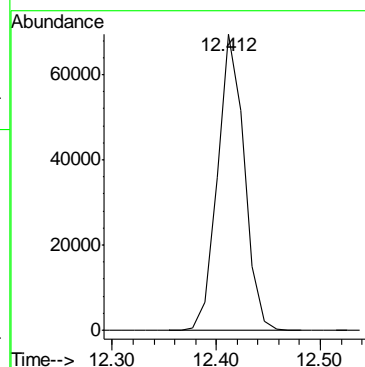
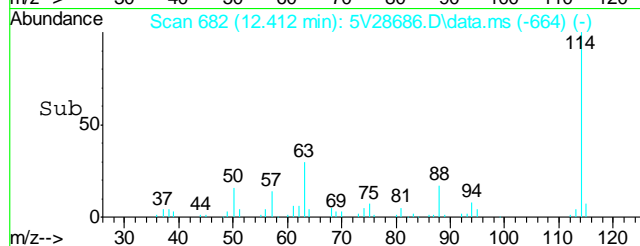
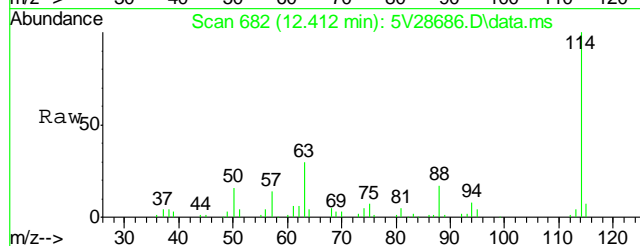
Tgt Ion:102 Resp: 8229





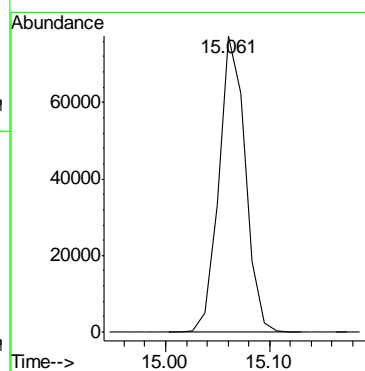
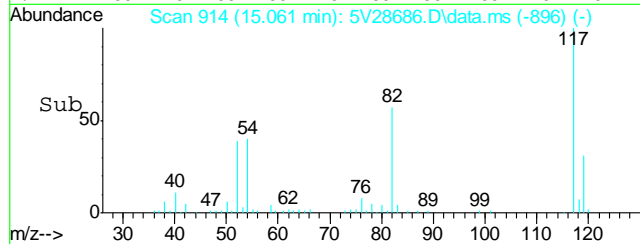
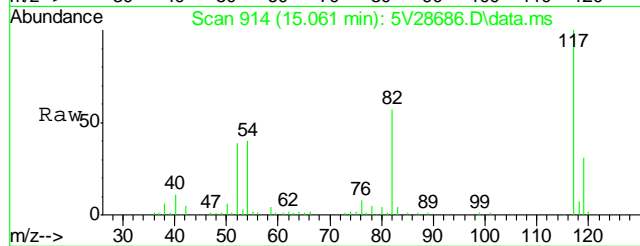
#37  
1,4-Difluorobenzene  
Concen: 50.00 ug/l  
RT: 12.412 min Scan# 682  
Delta R.T. -0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

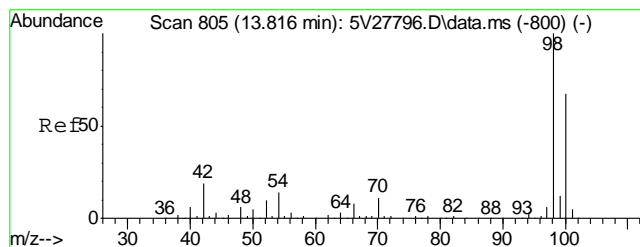
Tgt Ion:114 Resp: 124367



#56  
Chlorobenzene-d5  
Concen: 50.00 ug/l  
RT: 15.061 min Scan# 914  
Delta R.T. -0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

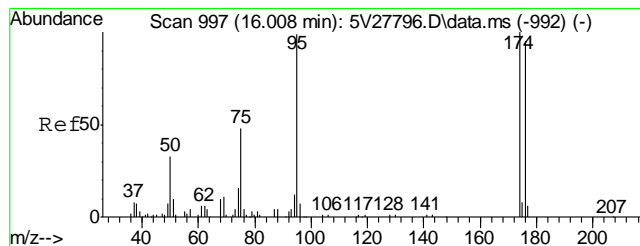
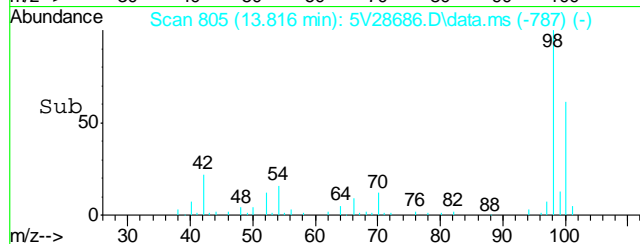
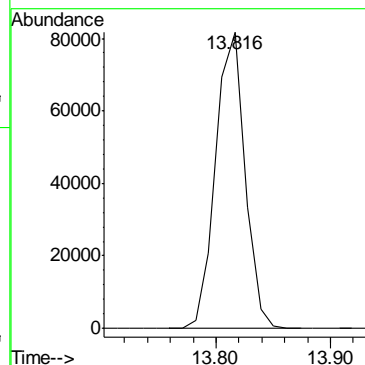
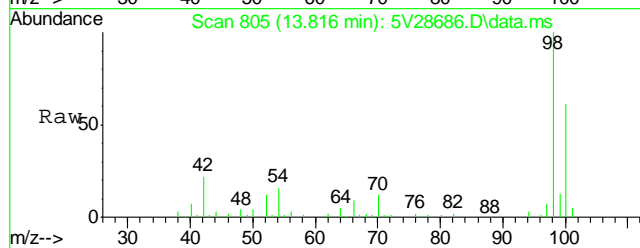
Tgt Ion:117 Resp: 136460





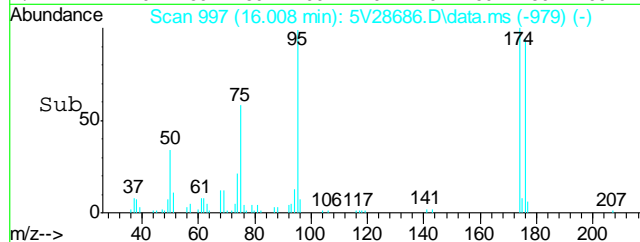
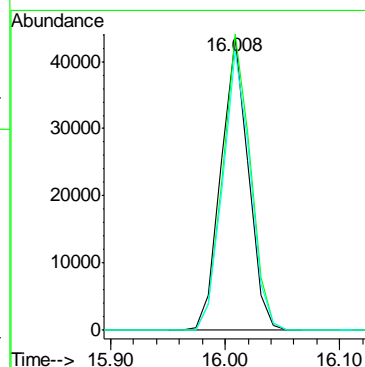
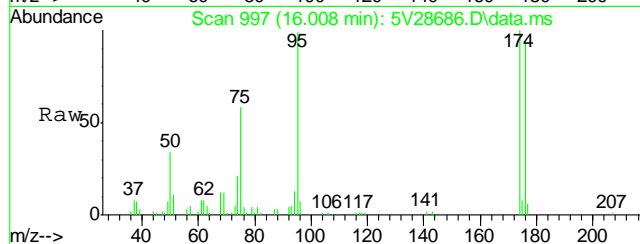
#64  
Toluene-d8  
Concen: 47.99 ug/l  
RT: 13.816 min Scan# 805  
Delta R.T. -0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

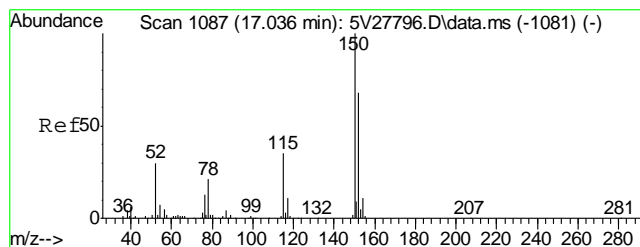
Tgt Ion: 98 Resp: 146109



#72  
4-Bromofluorobenzene  
Concen: 50.23 ug/l  
RT: 16.008 min Scan# 997  
Delta R.T. -0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

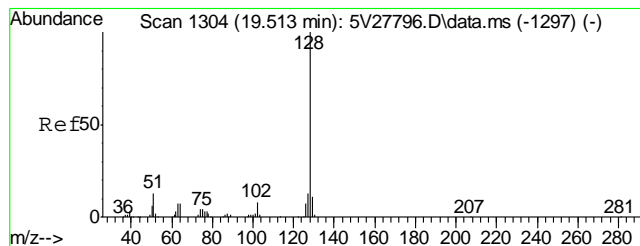
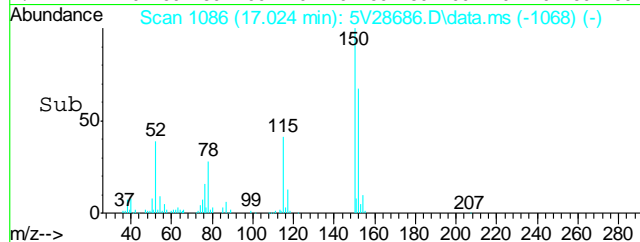
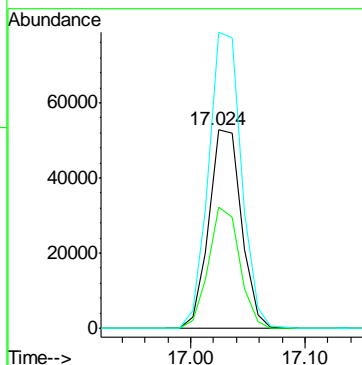
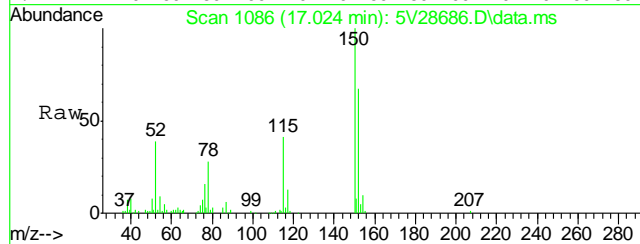
Tgt Ion: 95 Resp: 72470  
Ion Ratio Lower Upper  
95 100  
174 102.6 85.4 125.4  
176 96.7 80.6 120.6





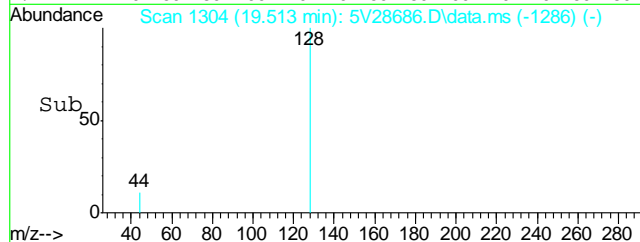
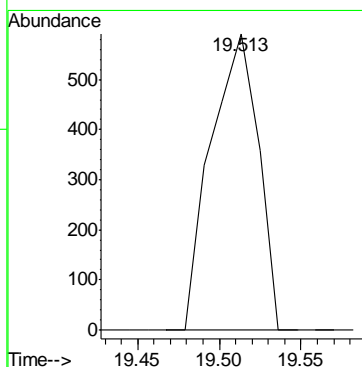
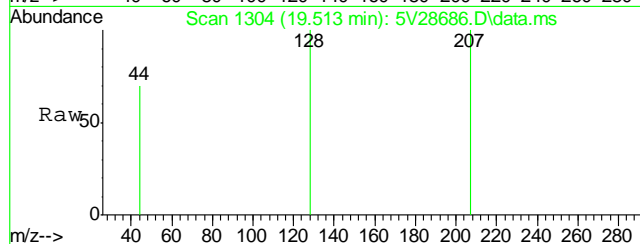
#77  
1,4-Dichlorobenzene-d4  
Concen: 50.00 ug/l  
RT: 17.024 min Scan# 1086  
Delta R.T. -0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

Tgt Ion:	152	Resp:	104852
Ion Ratio	Lower	Upper	
152	100		
115	58.2	43.4	65.2
150	150.0	142.9	214.3



#94  
Naphthalene  
Concen: 0.96 ug/l  
RT: 19.513 min Scan# 1304  
Delta R.T. 0.000 min  
Lab File: 5V28686.D  
Acq: 16 Aug 2013 12:20 pm

Tgt Ion:128 Resp: 1189



## GC/MS Semi-volatiles

### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries



**Method Blank Summary**

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP8392-MB	3G15945.D	1	08/19/13	DC	08/16/13	OP8392	E3G786

**The QC reported here applies to the following samples:****Method:** SW846 8270C BY SIM

D49492-1

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	8.3	4.3	ug/kg	
120-12-7	Anthracene	ND	8.3	4.3	ug/kg	
56-55-3	Benzo(a)anthracene	ND	8.3	4.3	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	8.3	4.3	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	8.3	4.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	8.3	4.3	ug/kg	
218-01-9	Chrysene	ND	8.3	4.3	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	8.3	4.3	ug/kg	
206-44-0	Fluoranthene	ND	8.3	4.3	ug/kg	
86-73-7	Fluorene	ND	8.3	5.0	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	8.3	4.3	ug/kg	
91-20-3	Naphthalene	ND	12	10	ug/kg	
129-00-0	Pyrene	ND	8.3	4.3	ug/kg	

CAS No.	Surrogate Recoveries	Limits
4165-60-0	Nitrobenzene-d5	89% 10-159%
321-60-8	2-Fluorobiphenyl	89% 19-131%
1718-51-0	Terphenyl-d14	105% 18-150%

8.1.1

8

## Blank Spike Summary

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP8392-BS	3G15946.D	1	08/19/13	DC	08/16/13	OP8392	E3G786

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D49492-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	67.6	81	68-130
120-12-7	Anthracene	83.3	66.6	80	67-130
56-55-3	Benzo(a)anthracene	83.3	66.2	79	65-130
205-99-2	Benzo(b)fluoranthene	83.3	62.9	75	44-130
207-08-9	Benzo(k)fluoranthene	83.3	78.5	94	56-131
50-32-8	Benzo(a)pyrene	83.3	68.3	82	62-130
218-01-9	Chrysene	83.3	76.6	92	70-130
53-70-3	Dibenzo(a,h)anthracene	83.3	89.0	107	55-130
206-44-0	Fluoranthene	83.3	67.1	81	70-130
86-73-7	Fluorene	83.3	66.8	80	70-130
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	89.1	107	56-130
91-20-3	Naphthalene	83.3	68.5	82	70-130
129-00-0	Pyrene	83.3	68.1	82	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	91%	10-159%
321-60-8	2-Fluorobiphenyl	86%	19-131%
1718-51-0	Terphenyl-d14	96%	18-150%

\* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP8392-MS	3G15948.D	1	08/19/13	DC	08/16/13	OP8392	E3G786
OP8392-MSD	3G15949.D	1	08/19/13	DC	08/16/13	OP8392	E3G786
D49242-6	3G15947.D	1	08/19/13	DC	08/16/13	OP8392	E3G786

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D49492-1

CAS No.	Compound	D49242-6 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		97.8	63.3	65	66.7	68	5	25-151/30
120-12-7	Anthracene	ND		97.8	74.3	76	80.7	83	8	39-159/30
56-55-3	Benzo(a)anthracene	ND		97.8	59.8	61	75.2	77	23	39-168/30
205-99-2	Benzo(b)fluoranthene	ND		97.8	92.2	94	97.2	99	5	24-163/30
207-08-9	Benzo(k)fluoranthene	ND		97.8	83.3	85	91.2	93	9	10-188/30
50-32-8	Benzo(a)pyrene	ND		97.8	91.5	94	102	104	11	32-144/30
218-01-9	Chrysene	ND		97.8	52.5	54	73.4	75	33* a	43-150/30
53-70-3	Dibenzo(a,h)anthracene	ND		97.8	97.4	100	107	109	9	21-152/30
206-44-0	Fluoranthene	12.8		97.8	89.0	78	93.9	83	5	36-157/30
86-73-7	Fluorene	114		97.8	193	81	179	66	8	10-182/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		97.8	99.1	101	110	112	10	20-154/30
91-20-3	Naphthalene	241		97.8	308	69	250	9* b	21	10-163/30
129-00-0	Pyrene	9.0	J	97.8	75.4	68	102	95	30	25-180/30

CAS No.	Surrogate Recoveries	MS	MSD	D49242-6	Limits
4165-60-0	Nitrobenzene-d5	67%	91%	69%	10-159%
321-60-8	2-Fluorobiphenyl	79%	81%	79%	19-131%
1718-51-0	Terphenyl-d14	75%	96%	81%	18-150%

(a) Variability of recovery may be due to sample matrix/homogeneity.

(b) Outside control limits due to high level in sample relative to spike amount.

\* = Outside of Control Limits.

GC/MS Semi-volatiles

Raw Data

6

## Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081913\  
 Data File : 3g15952.D  
 Acq On : 19 Aug 2013 2:49 pm  
 Operator : DONC  
 Sample : D49492-1  
 Misc : OP8392,E3G786,30.00,,,1,1  
 ALS Vial : 11 Sample Multiplier: 1

Quant Time: Aug 19 15:53:23 2013  
 Quant Method : C:\msdchem\1\METHODS\SIMPE3G784.M  
 Quant Title : PAHSIM BASE  
 QLast Update : Mon Aug 19 13:30:05 2013  
 Response via : Initial Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Naphthalene-d8	5.028	136	221840	4.0000	ug/mL	0.00
6) Acenaphthene-d10	6.733	164	116937	4.0000	ug/mL	0.00
15) Phenanthrene-d10	8.201	188	167038	4.0000	ug/mL	0.00
19) Chrysene-d12	10.854	240	178392	4.0000	ug/mL	0.00
24) Perylene-d12	12.193	264	151102	4.0000	ug/mL	-0.01

## System Monitoring Compounds

2) Nitrobenzene-d5	4.367	82	865604	28.8726	ug/mL	0.00
Spiked Amount 50.000	Range 25 - 135		Recovery =	57.74%		
7) 2-Fluorobiphenyl	6.083	172	1492071	35.3459	ug/mL	0.00
Spiked Amount 50.000	Range 25 - 135		Recovery =	70.70%		
21) Terphenyl-d14	9.807	244	1331904	34.3278	ug/mL	0.00
Spiked Amount 50.000	Range 25 - 135		Recovery =	68.66%		

## Target Compounds

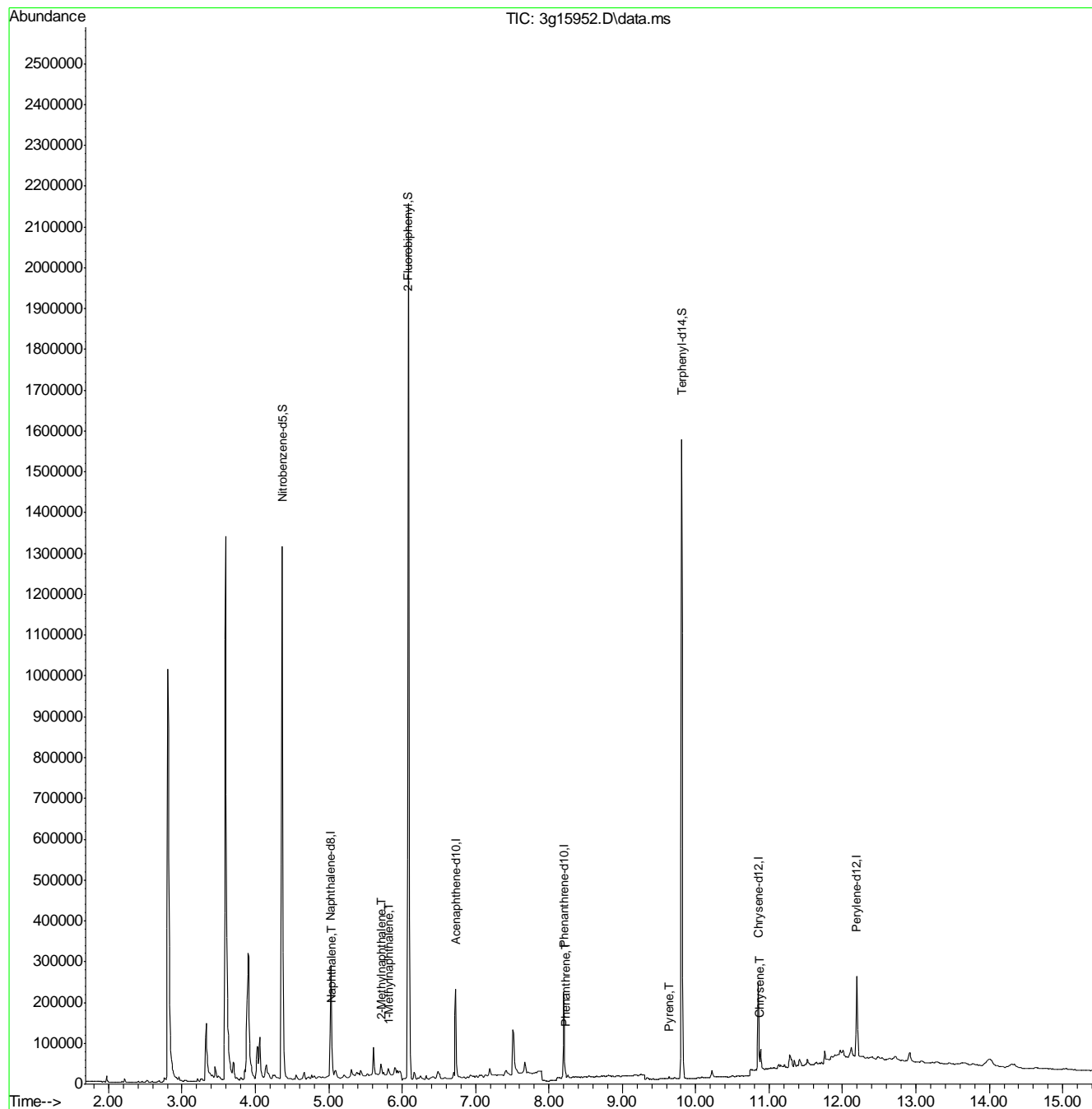
						Qvalue
3) N-Nitrosodimethylamine	0.000	74	0	N.D.	d	
4) N-Nitrosodi-propylamine	0.000	70	0	N.D.		
5) Naphthalene	5.040	128	11087	0.1480	ug/mL#	49
8) 2-Methylnaphthalene	5.713	142	15282	0.3555	ug/mL	97
9) 1-Methylnaphthalene	5.813	142	7214	0.1806	ug/mL#	70
10) Acenaphthylene	6.579	152	315	N.D.		
11) Acenaphthene	0.000	154	0	N.D.	d	
12) Dibenzofuran	6.957	168	2238	N.D.		
13) Fluorene	7.276	166	2148	N.D.		
14) Diphenylamine	0.000	169	0	N.D.	d	
16) Phenanthrene	8.225	178	6912	0.1099	ug/mL	70
17) Anthracene	0.000	178	0	N.D.	d	
18) Fluoranthene	9.412	202	1232	N.D.		
20) Pyrene	9.633	202	3944	0.0551	ug/mL	84
22) Benzo(a)anthracene	0.000	228	0	N.D.	d	
23) Chrysene	10.874	228	4253	0.0710	ug/mL	76
25) Benzo(b)fluoranthene	11.857	252	2548	N.D.		
26) Benzo(k)fluoranthene	11.857	252	2548	N.D.		
27) Benzo(a)pyrene	12.151	252	844	N.D.		
28) Indeno(1,2,3-cd)pyrene	13.193	276	978	N.D.		
29) Dibenz(a,h)anthracene	13.203	278	801	N.D.		
30) Benzo(g,h,i)perylene	13.476	276	1525	N.D.		

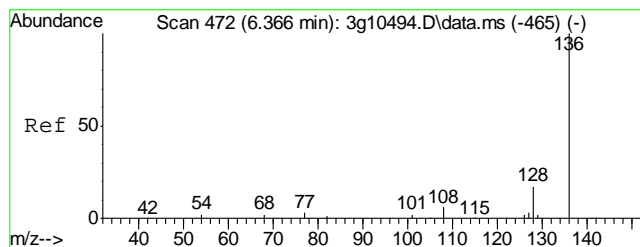
(#) = qualifier out of range (m) = manual integration (+) = signals summed

## Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081913\  
Data File : 3g15952.D  
Acq On : 19 Aug 2013 2:49 pm  
Operator : DONC  
Sample : D49492-1  
Misc : OP8392,E3G786,30.00,,,1,1  
ALS Vial : 11 Sample Multiplier: 1

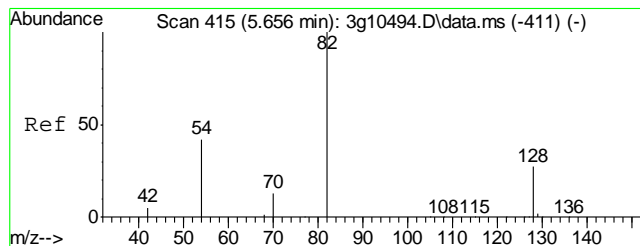
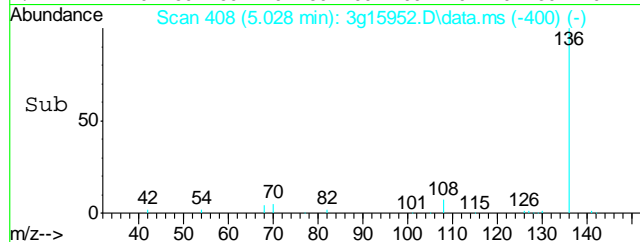
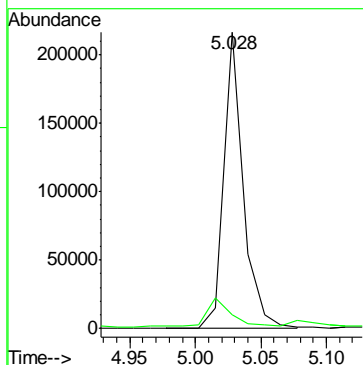
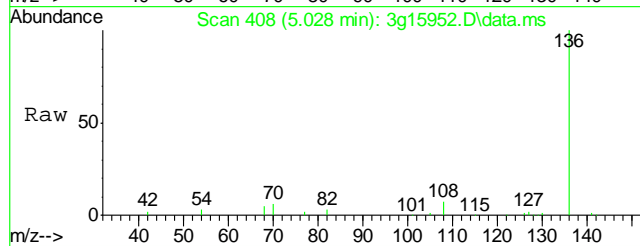
Quant Time: Aug 19 15:53:23 2013  
Quant Method : C:\msdchem\1\METHODS\SIMPE3G784.M  
Quant Title : PAHSIM BASE  
QLast Update : Mon Aug 19 13:30:05 2013  
Response via : Initial Calibration





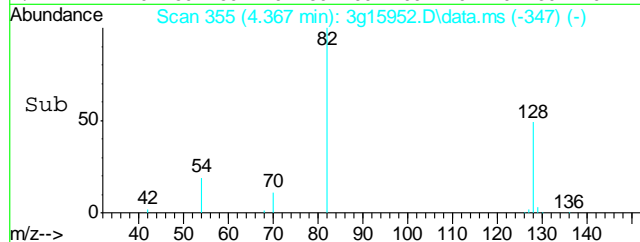
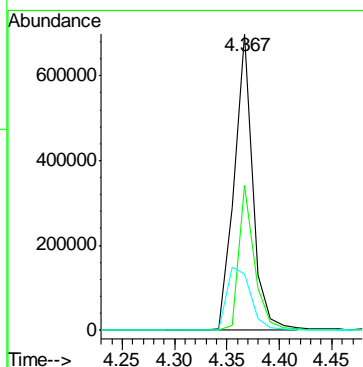
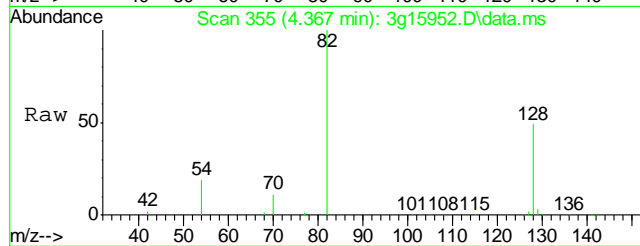
#1  
Naphthalene-d8  
Concen: 4.0000 ug/mL  
RT: 5.028 min Scan# 408  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

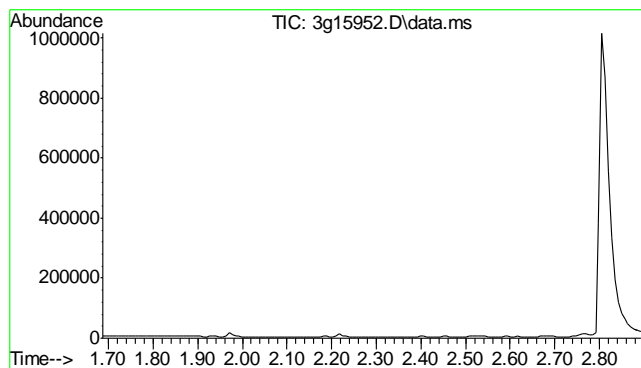
Tgt Ion	Ratio	Lower	Upper
136	100		
68	12.9	0.0	21.1



#2  
Nitrobenzene-d5  
Concen: 28.8726 ug/mL  
RT: 4.367 min Scan# 355  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

Tgt Ion	Ratio	Lower	Upper
82	100		
128	40.9	36.8	76.8
54	27.2	40.5	80.5#

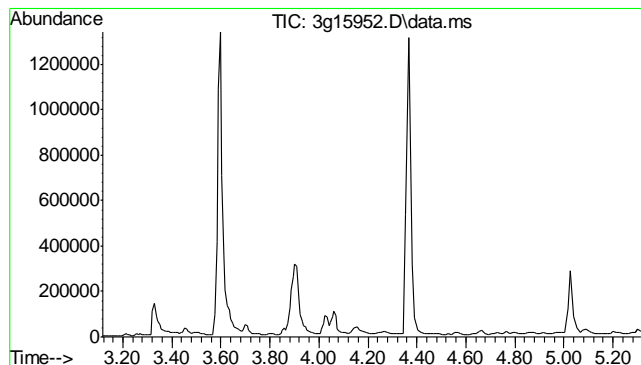
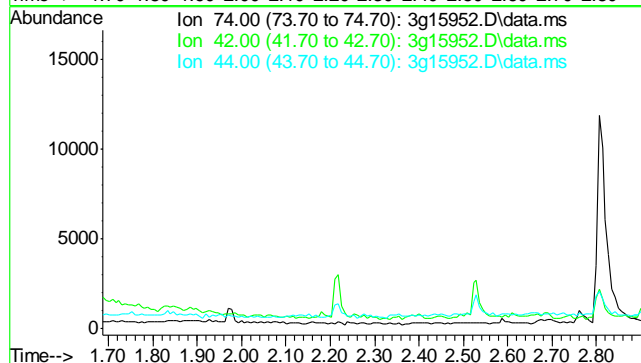




#3  
N-Nitrosodimethylamine  
Concen: N.D. ug/mL  
Expected RT: 1.80 min

Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

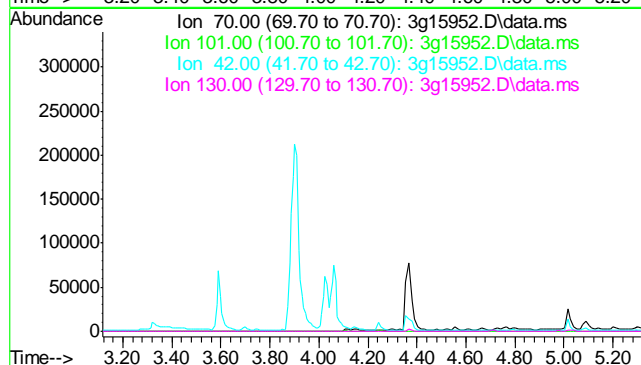
Tgt Ion	Exp Ratio
74	100
42	78.5
44	4.0



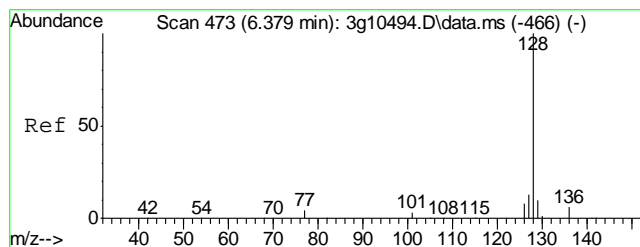
#4  
N-Nitrosodi-propylamine  
Concen: N.D. ug/mL  
Expected RT: 4.22 min

Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

Tgt Ion	Exp Ratio
70	100
101	11.9
42	57.4
130	21.7

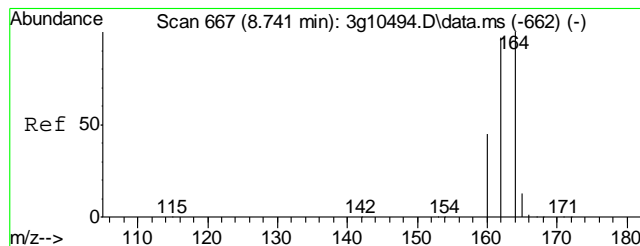
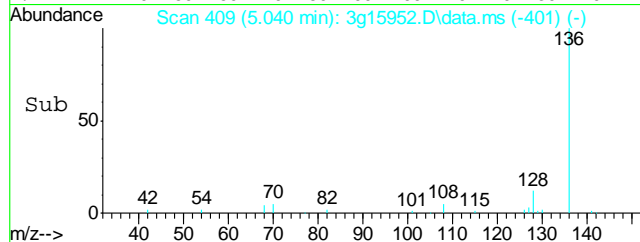
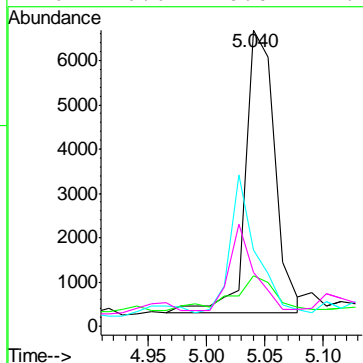
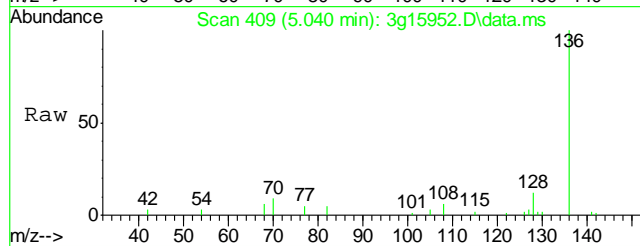






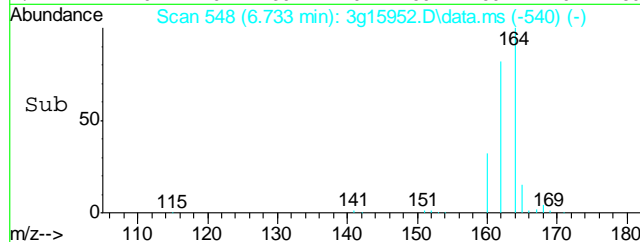
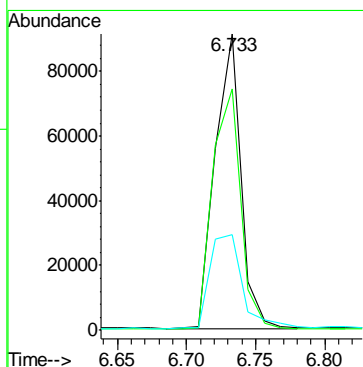
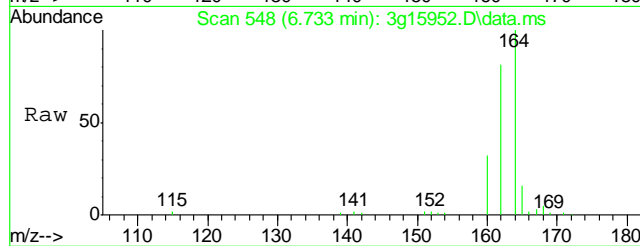
#5  
Naphthalene  
Concen: 0.1480 ug/mL  
RT: 5.040 min Scan# 409  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

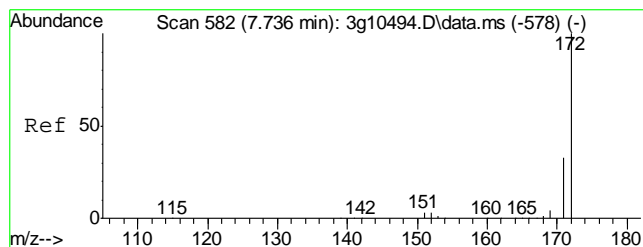
Tgt Ion:	128	Resp:	11087
Ion Ratio	Lower	Upper	
128	100		
129	17.6	0.0	31.2
127	43.5	0.0	32.4#
126	26.6	0.0	27.2



#6  
Acenaphthene-d10  
Concen: 4.0000 ug/mL  
RT: 6.733 min Scan# 548  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

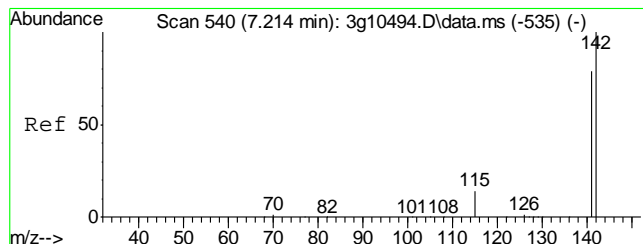
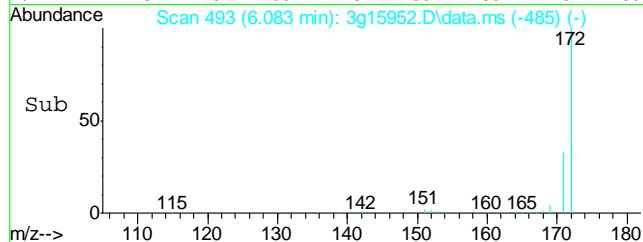
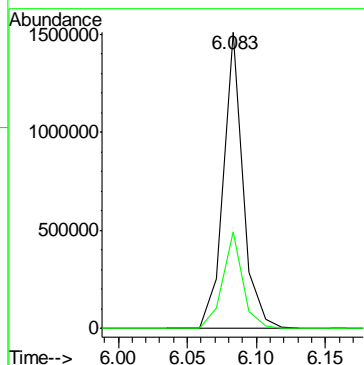
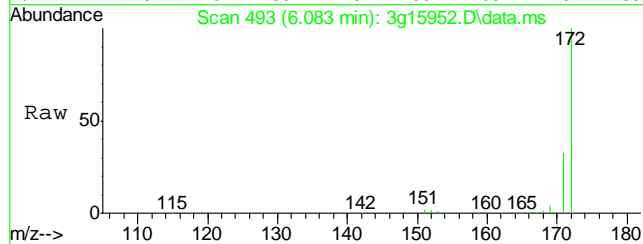
Tgt Ion:	164	Resp:	116937
Ion Ratio	Lower	Upper	
164	100		
162	88.8	83.7	123.7
160	40.5	31.9	71.9





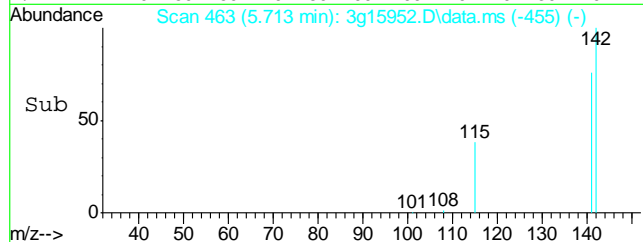
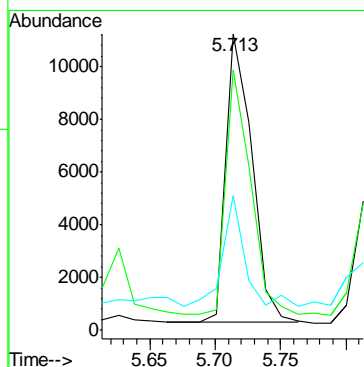
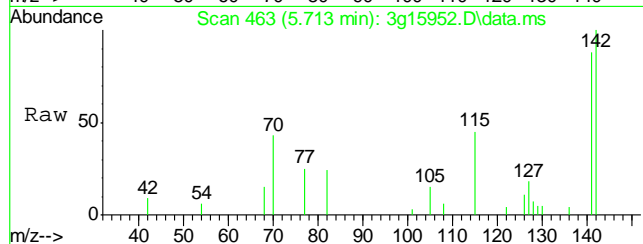
#7  
2-Fluorobiphenyl  
Concen: 35.3459 ug/mL  
RT: 6.083 min Scan# 493  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

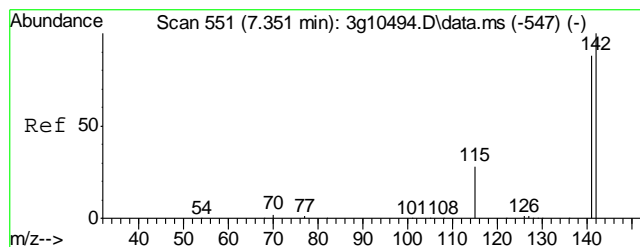
Tgt Ion	Ratio	Lower	Upper
172	100		
171	33.3	12.2	52.2



#8  
2-Methylnaphthalene  
Concen: 0.3555 ug/mL  
RT: 5.713 min Scan# 463  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

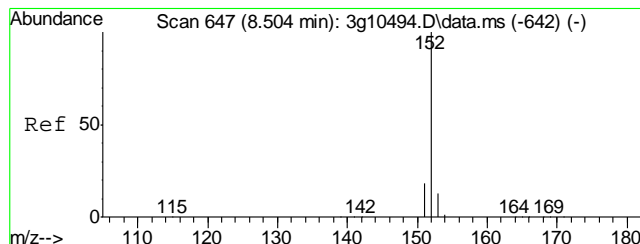
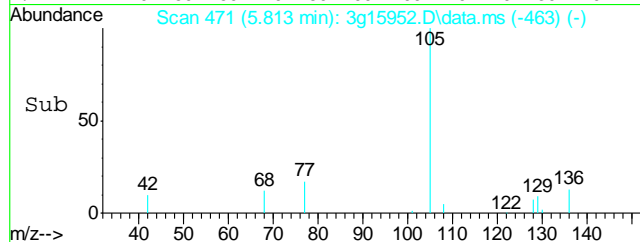
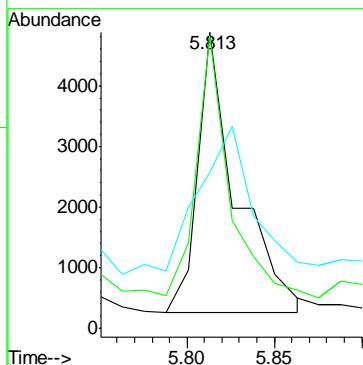
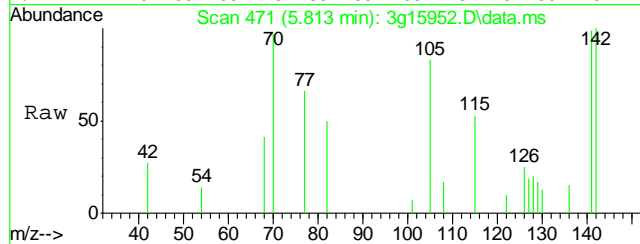
Tgt Ion	Ratio	Lower	Upper
142	100		
141	78.9	62.0	102.0
115	32.3	11.3	51.3





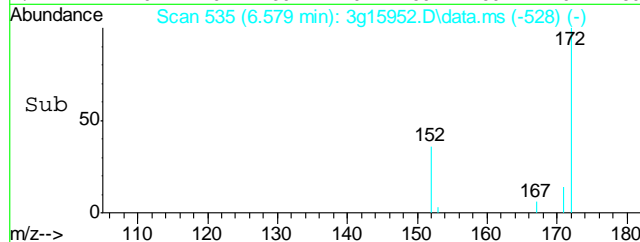
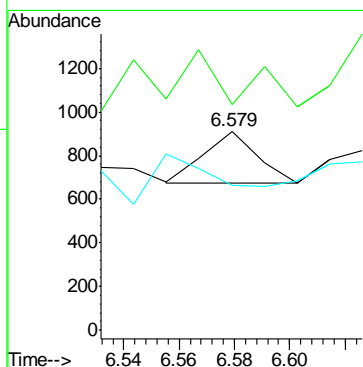
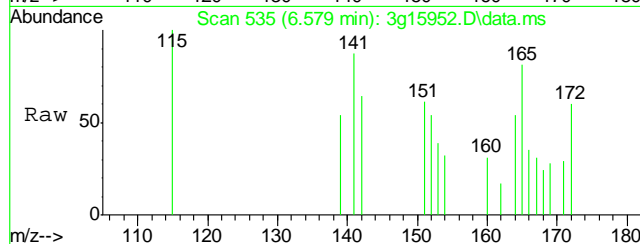
#9  
1-Methylnaphthalene  
Concen: 0.1806 ug/mL  
RT: 5.813 min Scan# 471  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

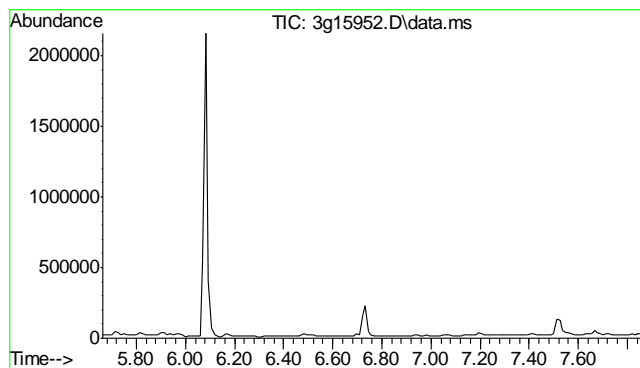
Tgt Ion	Ratio	Lower	Upper
142	100		
141	70.4	67.5	107.5
115	74.1	19.4	59.4



#10  
Acenaphthylene  
Concen: Below ug/mL  
RT: 6.579 min Scan# 535  
Delta R.T. -0.012 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

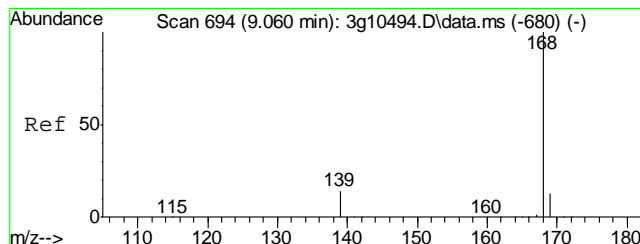
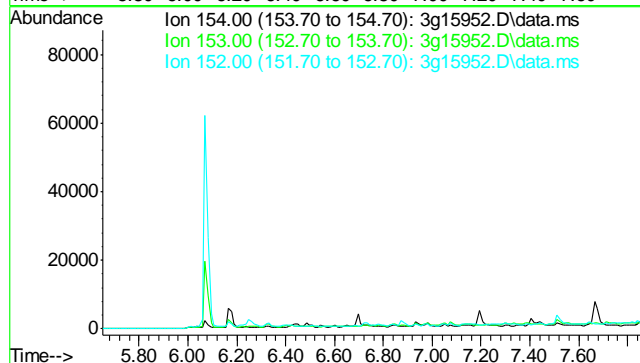
Tgt Ion	Ratio	Lower	Upper
152	100		
151	187.3	0.0	39.2
153	128.6	0.0	32.9





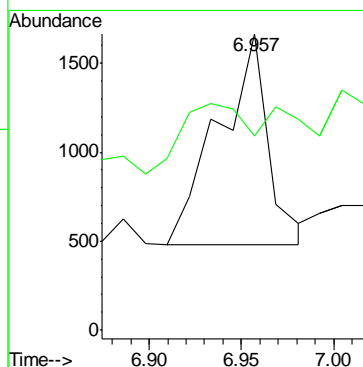
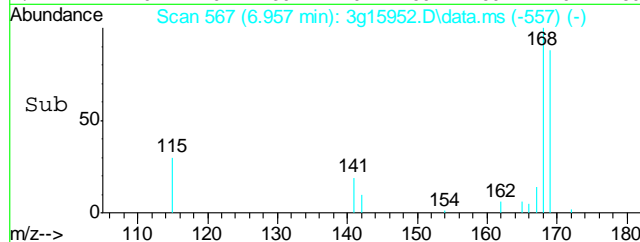
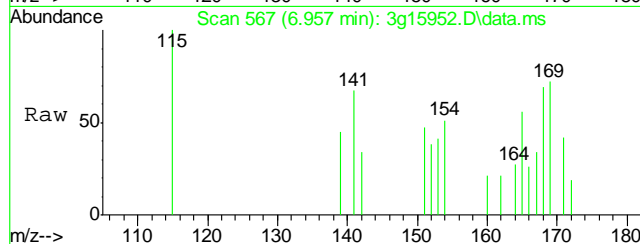
#11  
Acenaphthene  
Concen: N.D. ug/mL  
Expected RT: 6.76 min  
  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

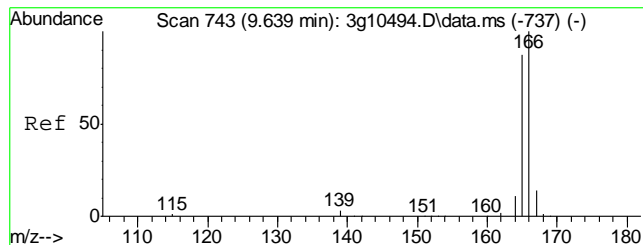
Tgt Ion: 154  
Sig Exp Ratio  
154 100  
153 102.4  
152 50.0



#12  
Dibenzofuran  
Concen: Below ug/mL  
RT: 6.957 min Scan# 567  
Delta R.T. 0.024 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

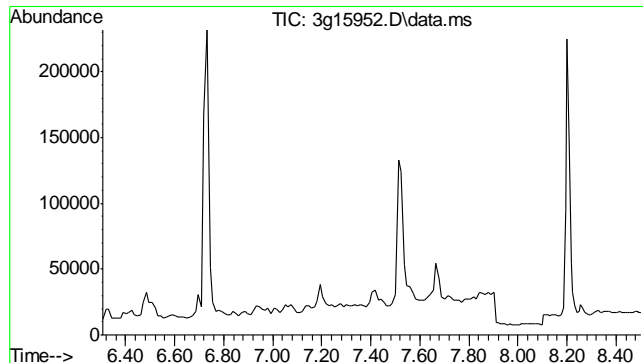
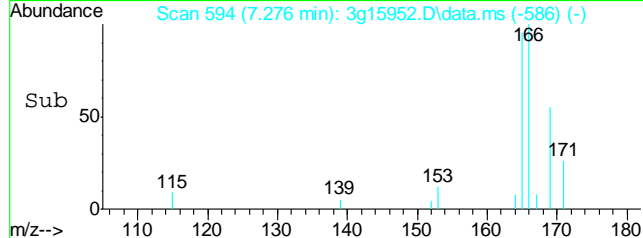
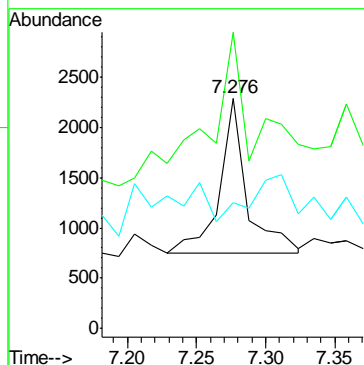
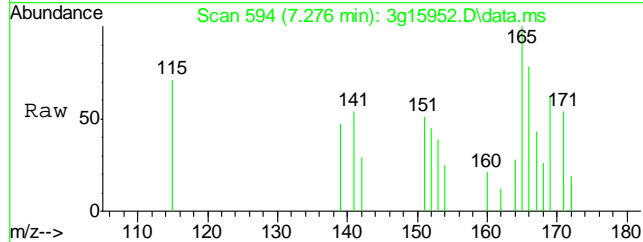
Tgt Ion: 168 Resp: 2238  
Ion Ratio Lower Upper  
168 100  
139 44.2 13.4 53.4





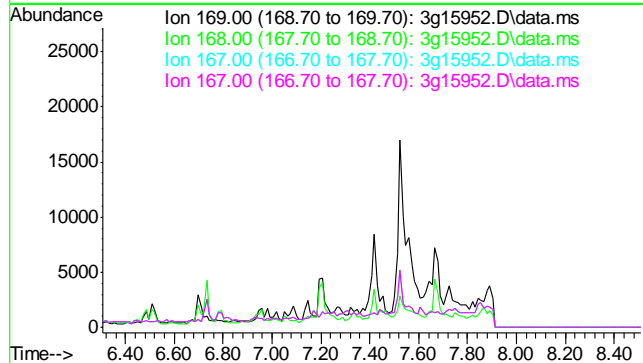
#13  
Fluorene  
Concen: Below ug/mL  
RT: 7.276 min Scan# 594  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

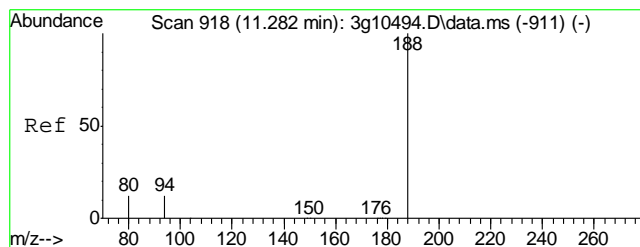
Tgt Ion	166	165	167
Resp	2148	153.7	43.2
Ratio	100	153.7	43.2
Lower		72.0	0.0
Upper		112.0	33.1



#14  
Diphenylamine  
Concen: N.D. ug/mL  
Expected RT: 7.41 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

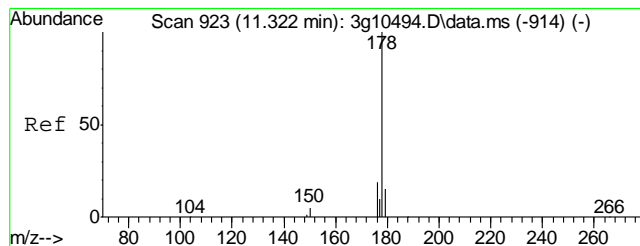
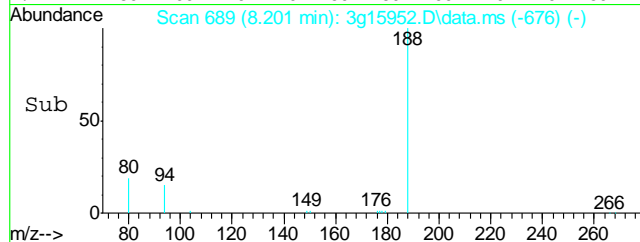
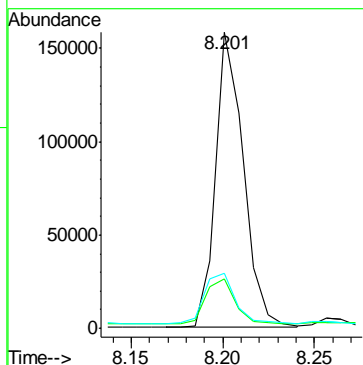
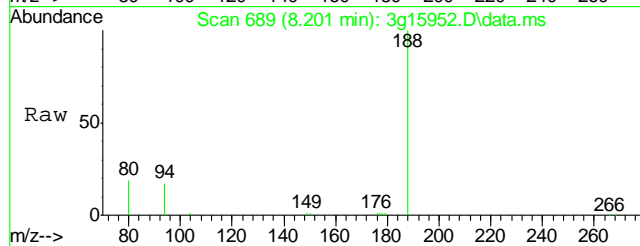
Tgt Ion	169	168	167
Sig	100	61.7	34.1
Exp Ratio		34.1	34.1





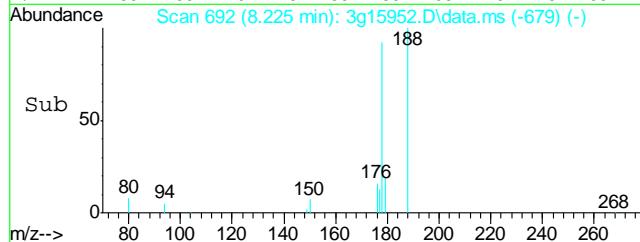
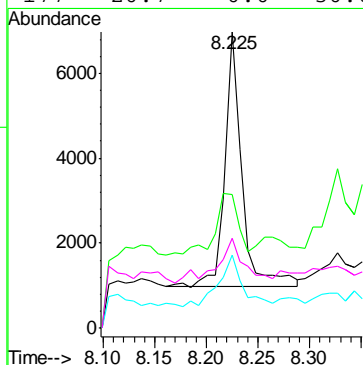
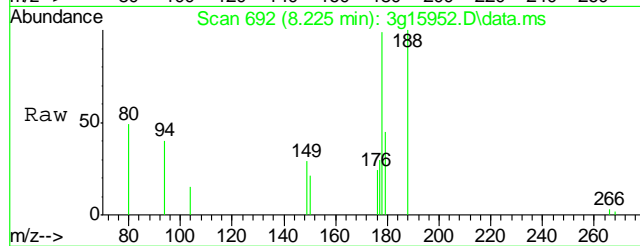
#15  
Phenanthrene-d10  
Concen: 4.0000 ug/mL  
RT: 8.201 min Scan# 689  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

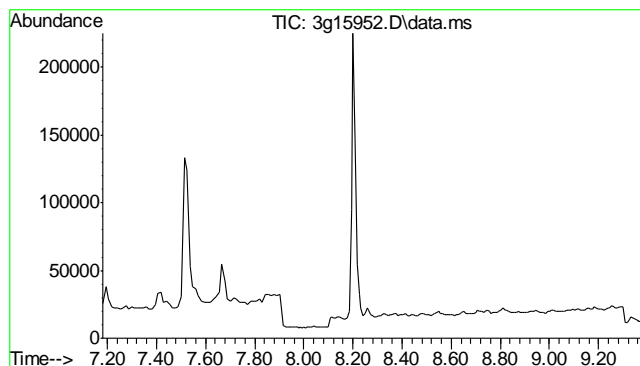
Tgt Ion	Ratio	Lower	Upper
188	100		
94	16.5	0.0	28.3
80	18.9	0.0	27.8



#16  
Phenanthrene  
Concen: 0.1099 ug/mL  
RT: 8.225 min Scan# 692  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

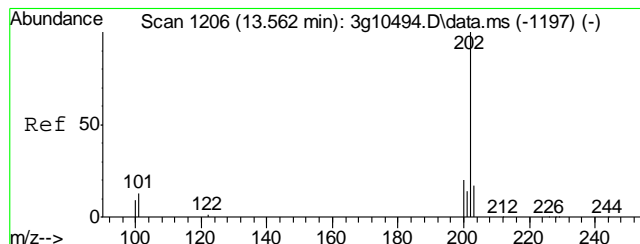
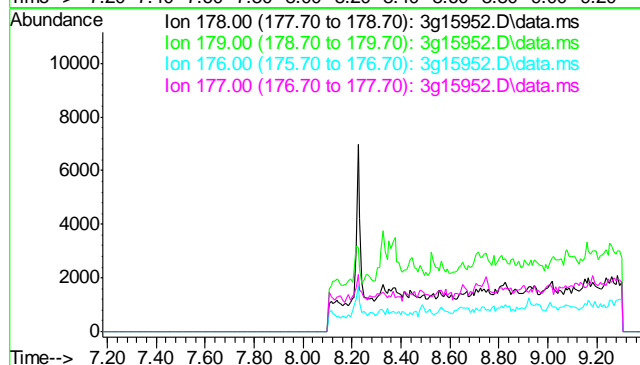
Tgt Ion	Ratio	Lower	Upper
178	100		
179	31.4	0.0	35.2
176	28.9	0.0	38.6
177	20.7	0.0	30.0





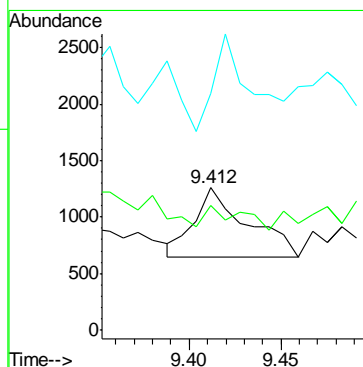
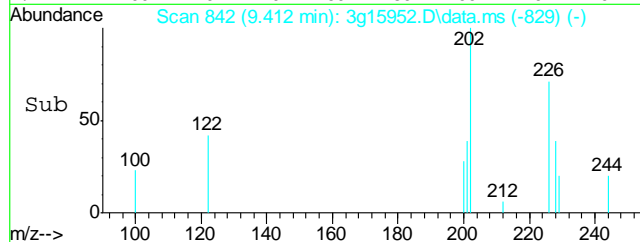
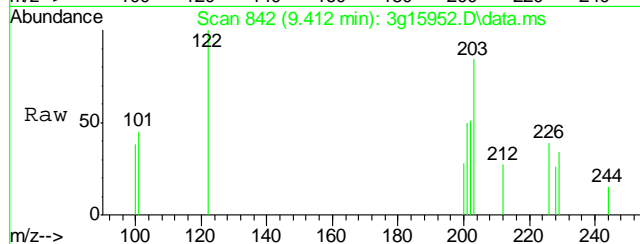
#17  
 Anthracene  
 Concen: N.D. ug/mL  
 Expected RT: 8.28 min  
  
 Lab File: 3g15952.D  
 Acq: 19 Aug 13 2:49 pm

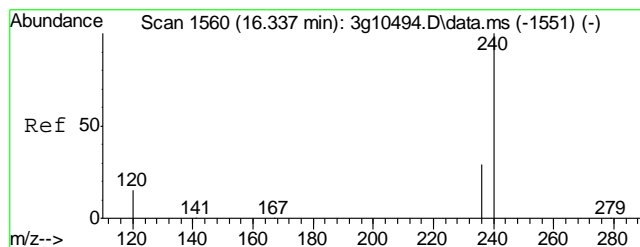
Tgt Ion: 178  
 Sig Exp Ratio  
 178 100  
 179 15.1  
 176 18.2  
 177 8.7



#18  
 Fluoranthene  
 Concen: Below ug/mL  
 RT: 9.412 min Scan# 842  
 Delta R.T. -0.000 min  
 Lab File: 3g15952.D  
 Acq: 19 Aug 13 2:49 pm

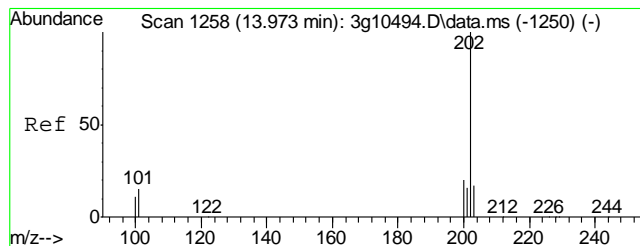
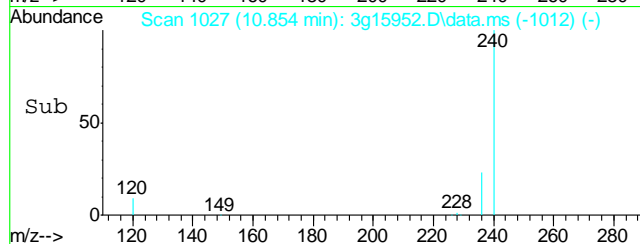
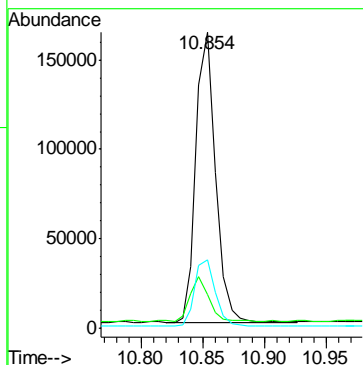
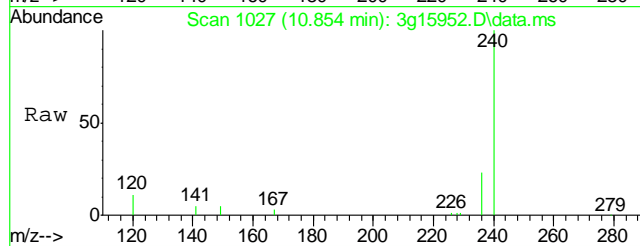
Tgt Ion: 202 Resp: 1232  
 Ion Ratio Lower Upper  
 202 100  
 101 23.7 0.0 32.6  
 203 98.2 0.0 37.4#





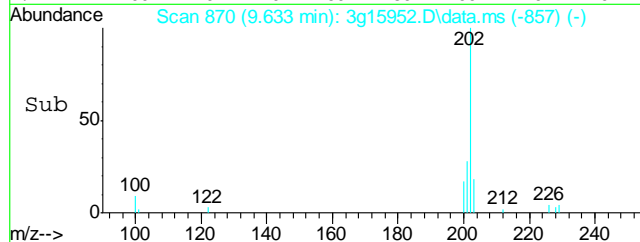
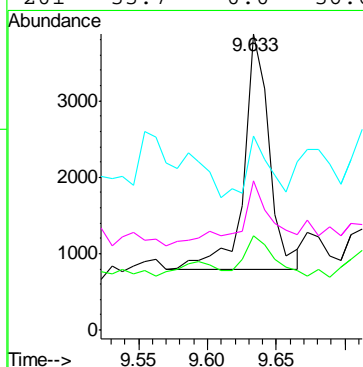
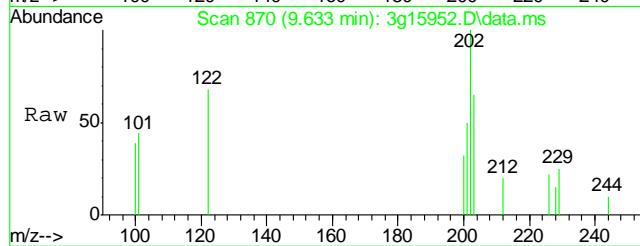
#19  
Chrysene-d12  
Concen: 4.0000 ug/mL  
RT: 10.854 min Scan# 1027  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

Tgt Ion	Ratio	Lower	Upper
240	100		
120	15.1	0.2	40.2
236	24.5	8.8	48.8

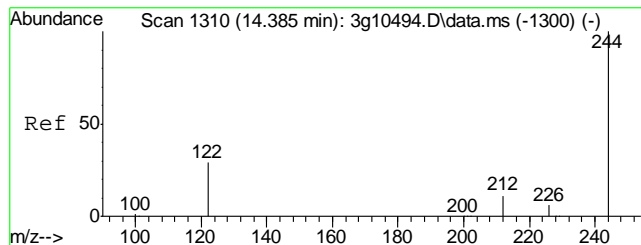


#20  
Pyrene  
Concen: 0.0551 ug/mL  
RT: 9.633 min Scan# 870  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

Tgt Ion	Ratio	Lower	Upper
202	100		
200	19.5	0.2	40.2
203	22.6	0.0	37.8
201	33.7	0.0	36.6

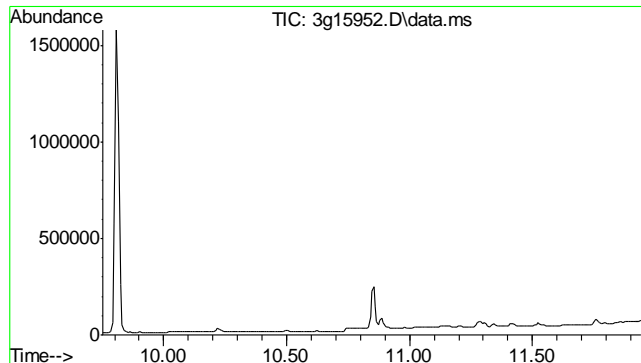
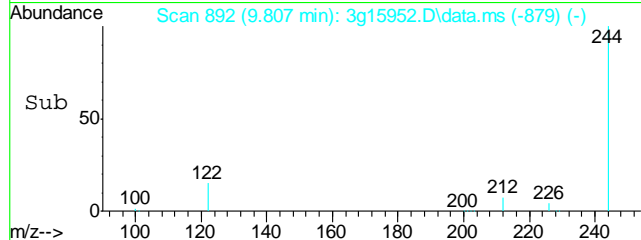
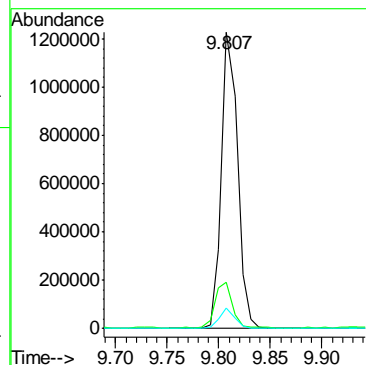
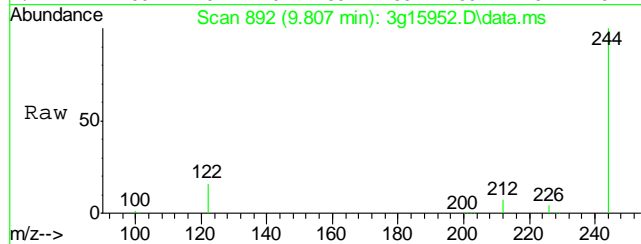






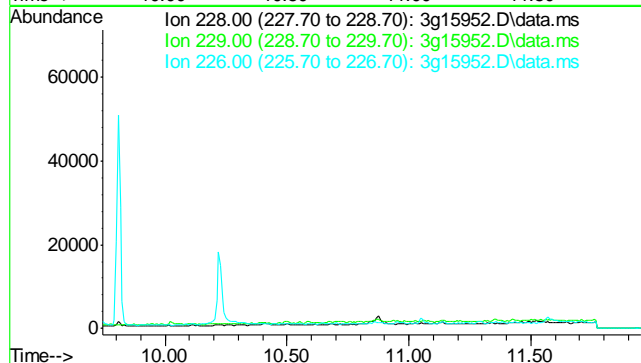
#21  
Terphenyl-d14  
Concen: 34.3278 ug/mL  
RT: 9.807 min Scan# 892  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

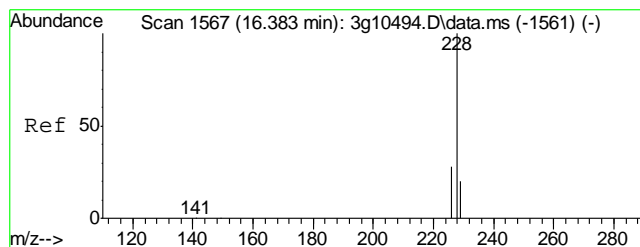
Tgt Ion: 244	Resp: 1331904
Ion Ratio	Lower Upper
244	100
122	16.1 7.8 47.8
212	6.1 0.0 32.8



#22  
Benzo(a)anthracene  
Concen: N.D. ug/mL  
Expected RT: 10.85 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

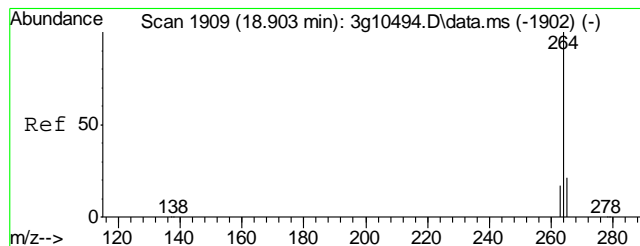
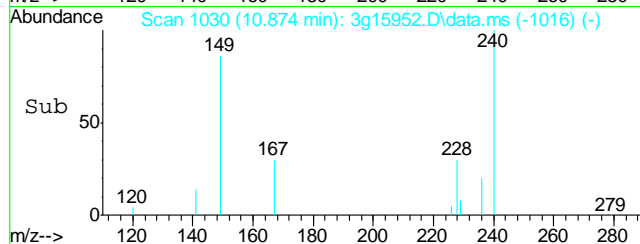
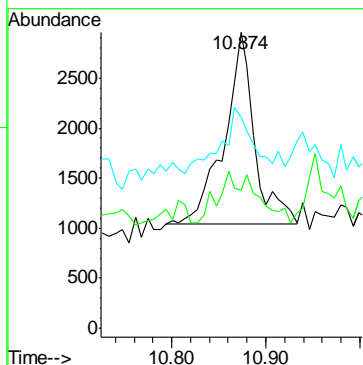
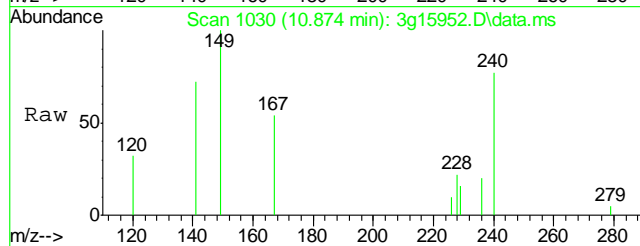
Tgt Ion: 228	
Sig	Exp Ratio
228	100
229	19.4
226	26.6





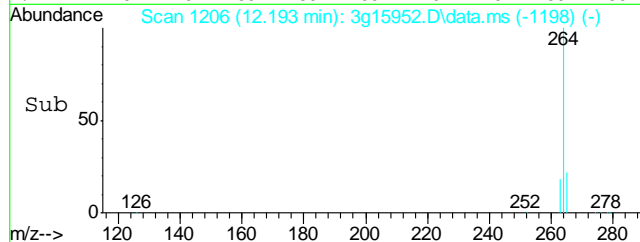
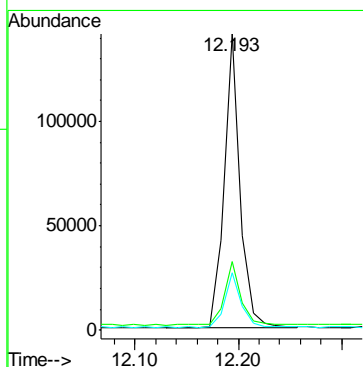
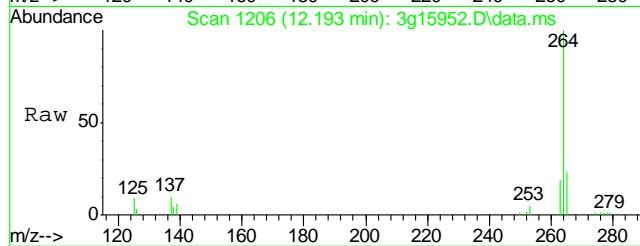
#23  
Chrysene  
Concen: 0.0710 ug/mL  
RT: 10.874 min Scan# 1030  
Delta R.T. -0.007 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

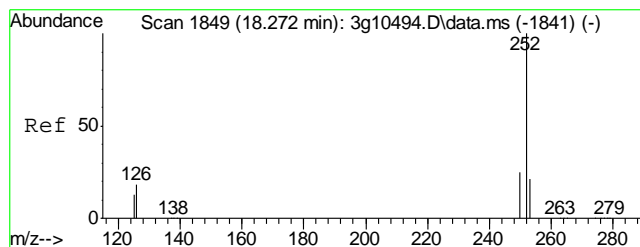
Tgt Ion:	228	Resp:	4253
Ion Ratio	Lower	Upper	
228	100		
226	19.3	8.6	48.6
229	35.1	0.0	39.4



#24  
Perylene-d12  
Concen: 4.0000 ug/mL  
RT: 12.193 min Scan# 1206  
Delta R.T. -0.011 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

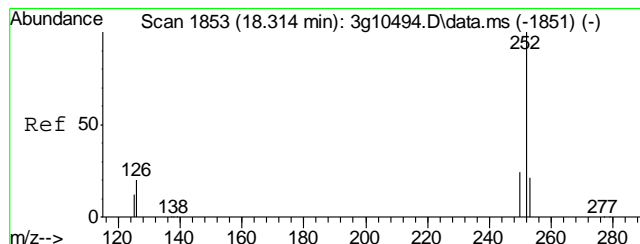
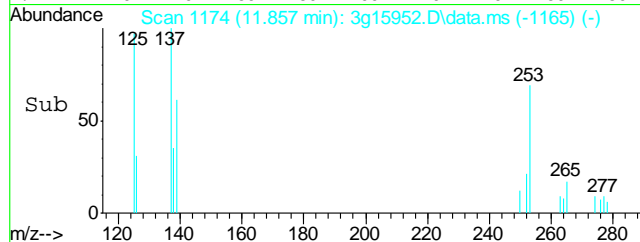
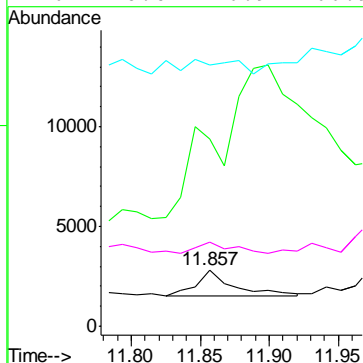
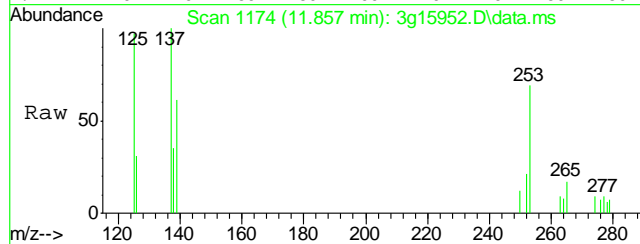
Tgt Ion:	264	Resp:	151102
Ion Ratio	Lower	Upper	
264	100		
265	22.7	1.2	41.2
263	19.7	0.7	40.7





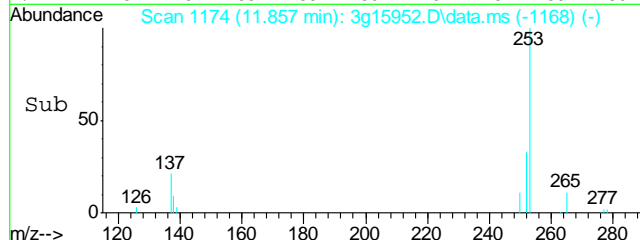
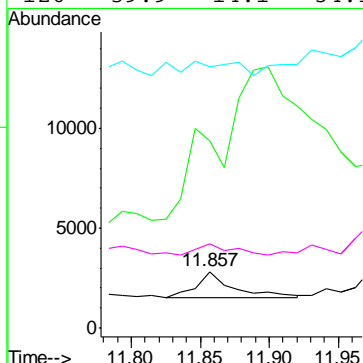
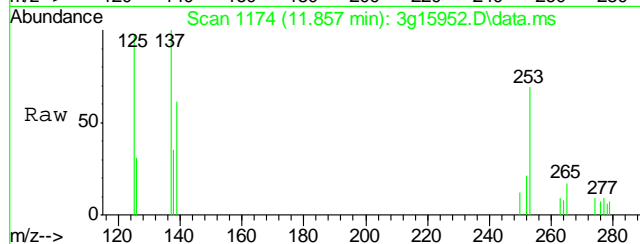
#25  
Benzo(b)fluoranthene  
Concen: Below ug/mL  
RT: 11.857 min Scan# 1174  
Delta R.T. -0.011 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

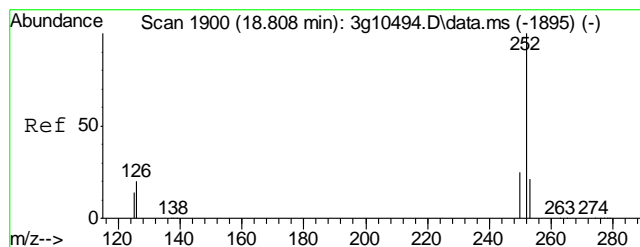
Tgt Ion:	252	Resp:	2548
Ion Ratio	Lower	Upper	
252	100		
253	1131.9	31.5	71.5#
125	0.0	0.0	33.2
126	0.0	26.9	66.9#



#26  
Benzo(k)fluoranthene  
Concen: Below ug/mL  
RT: 11.857 min Scan# 1174  
Delta R.T. -0.032 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

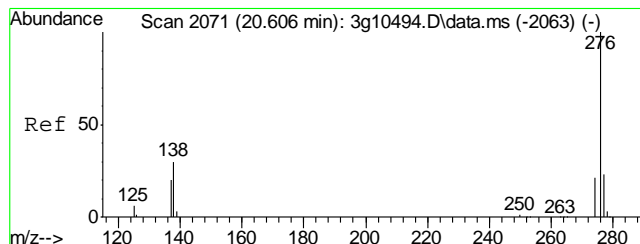
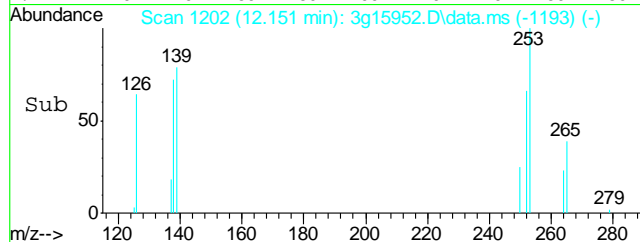
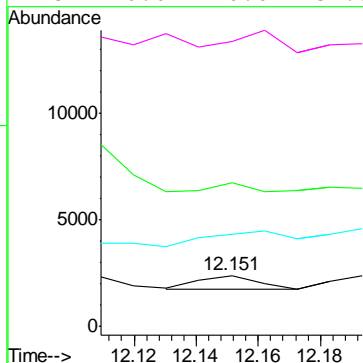
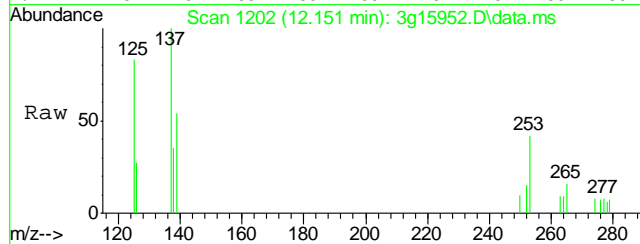
Tgt Ion:	252	Resp:	2548
Ion Ratio	Lower	Upper	
252	100		
253	0.0	17.3	57.3#
125	81.6	0.0	29.6#
126	39.9	14.1	54.1





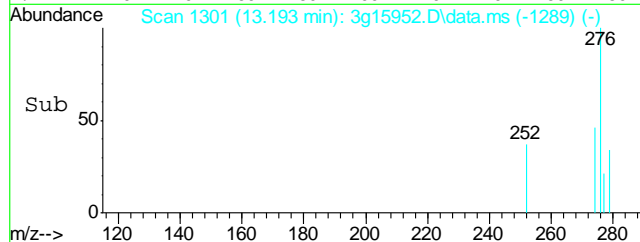
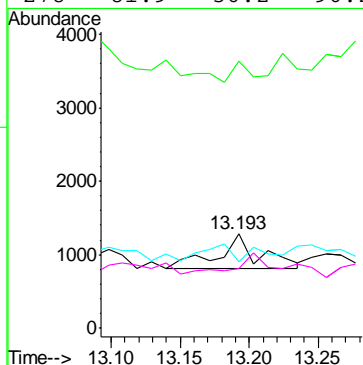
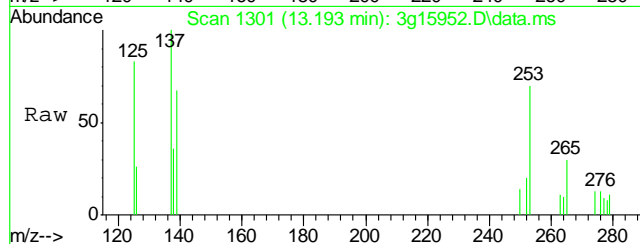
#27  
Benzo(a)pyrene  
Concen: Below ug/mL  
RT: 12.151 min Scan# 1202  
Delta R.T. -0.000 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

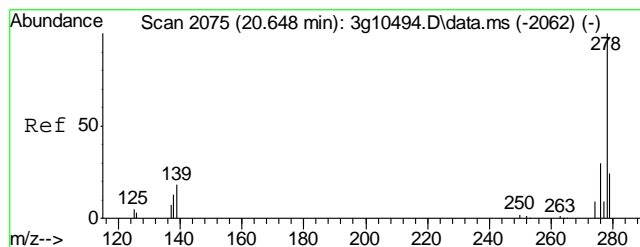
Tgt Ion:	252	Resp:	844
Ion Ratio	100	Lower	Upper
252	100		
253	77.0	1.5	41.5#
126	157.9	0.4	40.4#
125	0.0	0.0	34.5



#28  
Indeno(1,2,3-cd)pyrene  
Concen: Below ug/mL  
RT: 13.193 min Scan# 1301  
Delta R.T. -0.021 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

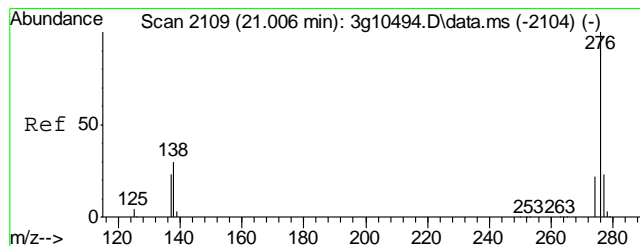
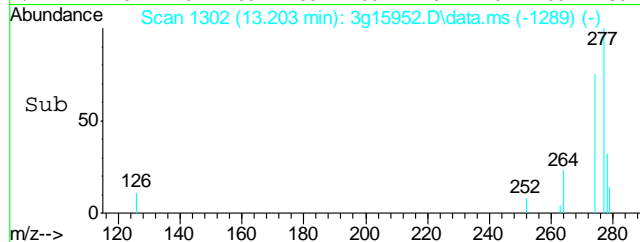
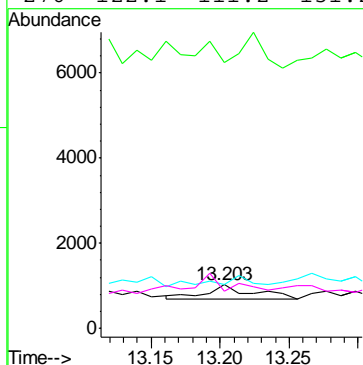
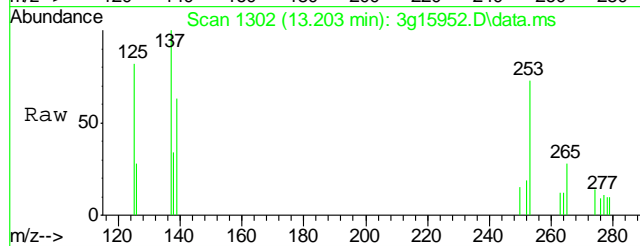
Tgt Ion:	276	Resp:	978
Ion Ratio	100	Lower	Upper
276	100		
138	24.5	20.0	60.0
277	35.6	4.8	44.8
278	81.9	56.2	96.2





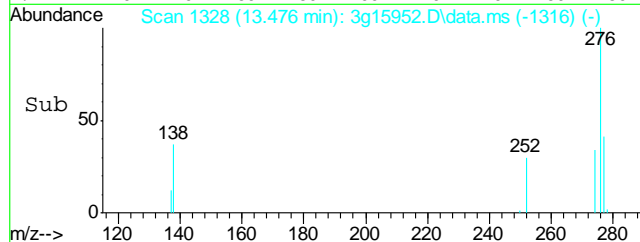
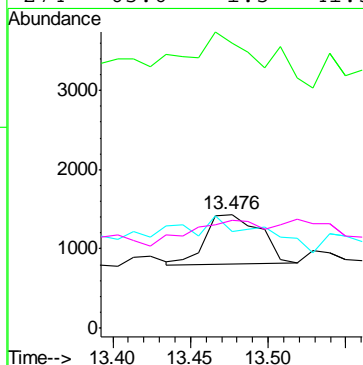
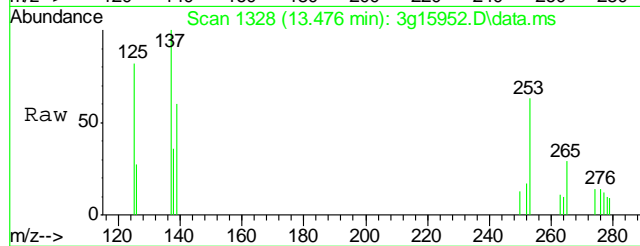
#29  
Dibenz(a,h)anthracene  
Concen: Below ug/mL  
RT: 13.203 min Scan# 1302  
Delta R.T. -0.011 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

Tgt Ion	Ratio	Lower	Upper
278	100		
139	112.2	10.8	50.8#
279	30.8	2.9	42.9
276	122.1	111.2	151.2



#30  
Benzo(g,h,i)perylene  
Concen: Below ug/mL  
RT: 13.476 min Scan# 1328  
Delta R.T. -0.021 min  
Lab File: 3g15952.D  
Acq: 19 Aug 13 2:49 pm

Tgt Ion	Ratio	Lower	Upper
276	100		
138	160.9	15.1	55.1#
277	21.9	3.3	43.3
274	65.6	1.5	41.5#



## Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081913\  
 Data File : 3g15945.D  
 Acq On : 19 Aug 2013 11:58 am  
 Operator : DONC  
 Sample : OP8392-MB  
 Misc : OP8392,E3G786,30.00,,,1,1  
 ALS Vial : 4 Sample Multiplier: 1

Quant Time: Aug 19 14:01:20 2013  
 Quant Method : C:\msdchem\1\METHODS\SIMPE3G784.M  
 Quant Title : PAHSIM BASE  
 QLast Update : Mon Aug 19 13:30:05 2013  
 Response via : Initial Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Naphthalene-d8	5.028	136	175562	4.0000	ug/mL	0.00
6) Acenaphthene-d10	6.733	164	97041	4.0000	ug/mL	0.00
15) Phenanthrene-d10	8.201	188	163219	4.0000	ug/mL	0.00
19) Chrysene-d12	10.860	240	165436	4.0000	ug/mL	0.00
24) Perylene-d12	12.204	264	134798	4.0000	ug/mL	0.00

## System Monitoring Compounds

2) Nitrobenzene-d5	4.367	82	1052844	44.3212	ug/mL	0.00
Spiked Amount 50.000	Range	25 - 135	Recovery	=	88.64%	
7) 2-Fluorobiphenyl	6.083	172	1556529	44.4328	ug/mL	0.00
Spiked Amount 50.000	Range	25 - 135	Recovery	=	88.86%	
21) Terphenyl-d14	9.815	244	1894689	52.6571	ug/mL	0.00
Spiked Amount 50.000	Range	25 - 135	Recovery	=	105.32%	

## Target Compounds

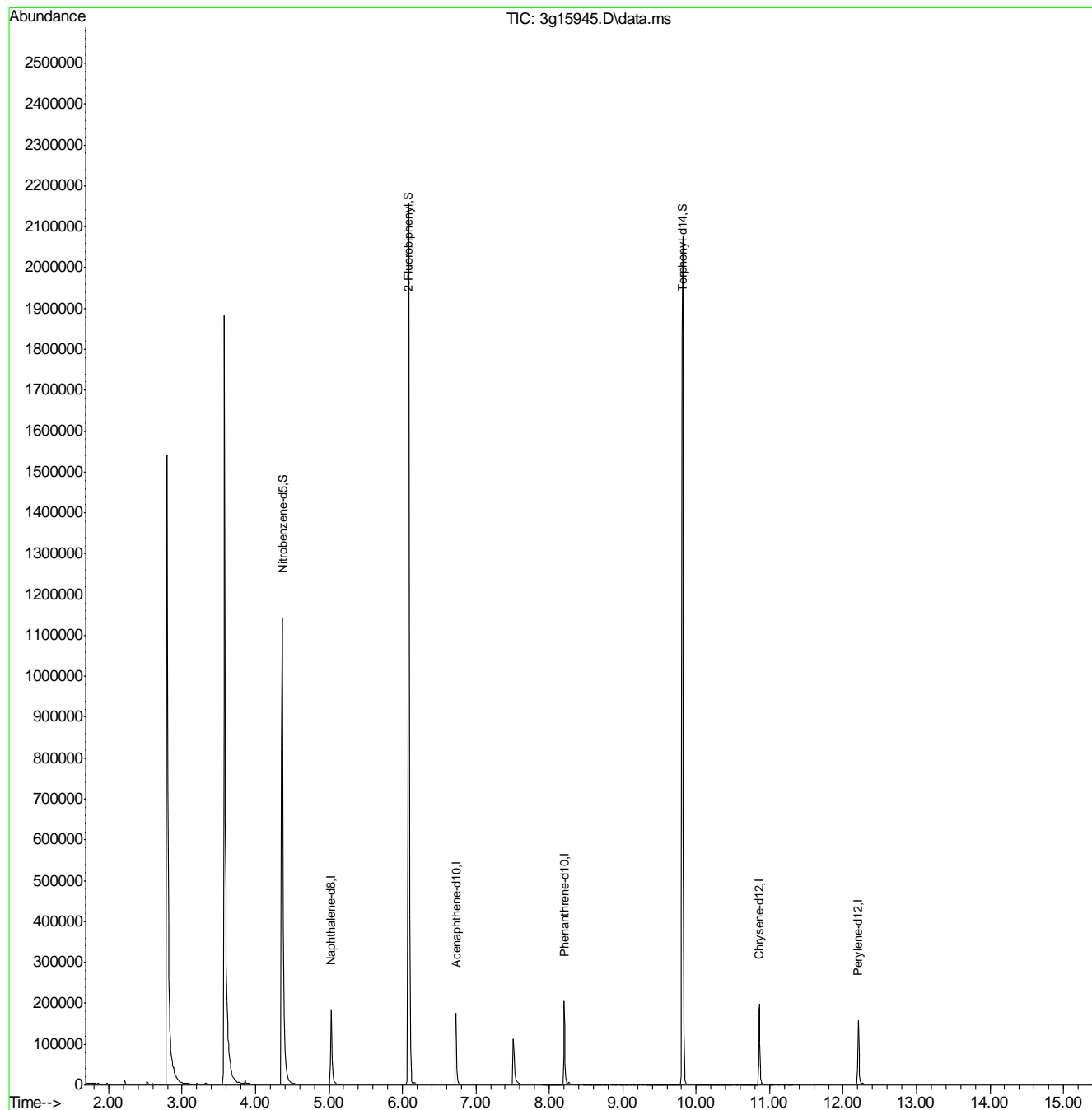
					Qvalue
3) N-Nitrosodimethylamine	0.000	74	0	N.D.	d
4) N-Nitrosodi-propylamine	0.000	70	0	N.D.	d
5) Naphthalene	5.053	128	452	N.D.	
8) 2-Methylnaphthalene	5.738	142	159	N.D.	
9) 1-Methylnaphthalene	5.813	142	99	N.D.	
10) Acenaphthylene	6.591	152	82	N.D.	
11) Acenaphthene	6.733	154	405	N.D.	
12) Dibenzofuran	6.957	168	86	N.D.	
13) Fluorene	7.288	166	68	N.D.	
14) Diphenylamine	7.406	169	148	N.D.	
16) Phenanthrene	8.233	178	385	N.D.	
17) Anthracene	8.288	178	136	N.D.	
18) Fluoranthene	9.420	202	109	N.D.	
20) Pyrene	9.641	202	164	N.D.	
22) Benzo(a)anthracene	10.860	228	574	N.D.	
23) Chrysene	10.860	228	593	N.D.	
25) Benzo(b)fluoranthene	11.836	252	63	N.D.	
26) Benzo(k)fluoranthene	11.910	252	74	N.D.	
27) Benzo(a)pyrene	12.120	252	112	N.D.	
28) Indeno(1,2,3-cd)pyrene	13.214	276	45	N.D.	
29) Dibenz(a,h)anthracene	13.193	278	83	N.D.	
30) Benzo(g,h,i)perylene	13.529	276	162	Below	Cal # 71

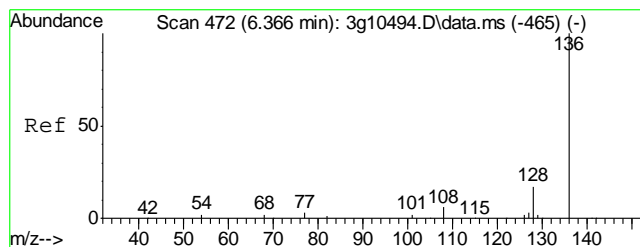
(#) = qualifier out of range (m) = manual integration (+) = signals summed

## Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081913\  
Data File : 3g15945.D  
Acq On : 19 Aug 2013 11:58 am  
Operator : DONC  
Sample : OP8392-MB  
Misc : OP8392,E3G786,30.00,,,1,1  
ALS Vial : 4 Sample Multiplier: 1

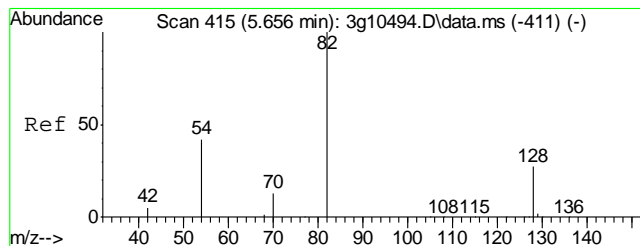
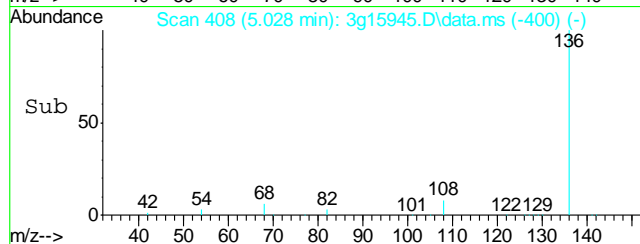
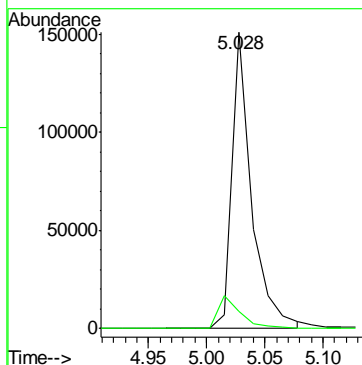
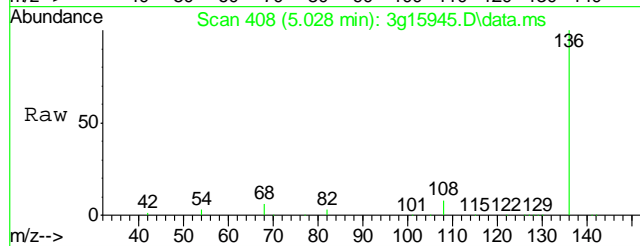
Quant Time: Aug 19 14:01:20 2013  
Quant Method : C:\msdchem\1\METHODS\SIMPE3G784.M  
Quant Title : PAHSIM BASE  
QLast Update : Mon Aug 19 13:30:05 2013  
Response via : Initial Calibration





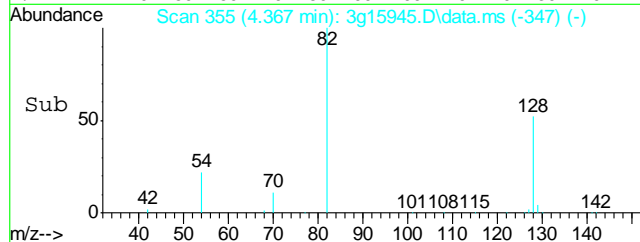
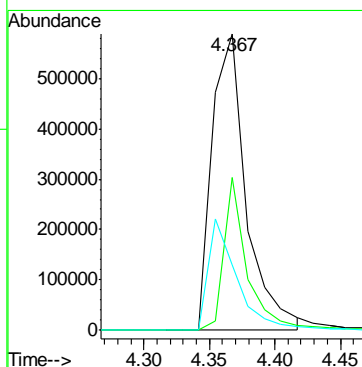
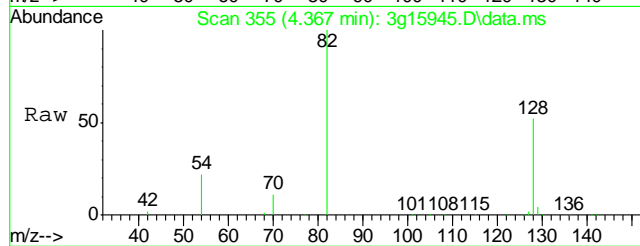
#1  
Naphthalene-d8  
Concen: 4.0000 ug/mL  
RT: 5.028 min Scan# 408  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

Tgt Ion: 136	Resp: 175562
Ion Ratio	Lower Upper
136 100	
68 12.6	0.0 21.1

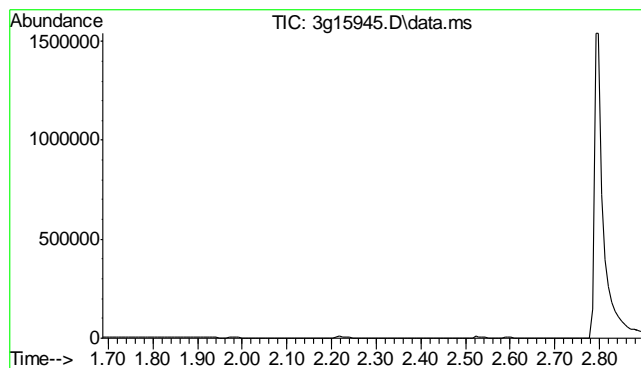


#2  
Nitrobenzene-d5  
Concen: 44.3212 ug/mL  
RT: 4.367 min Scan# 355  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

Tgt Ion: 82	Resp: 1052844
Ion Ratio	Lower Upper
82 100	
128 34.9	36.8 76.8#
54 31.0	40.5 80.5#



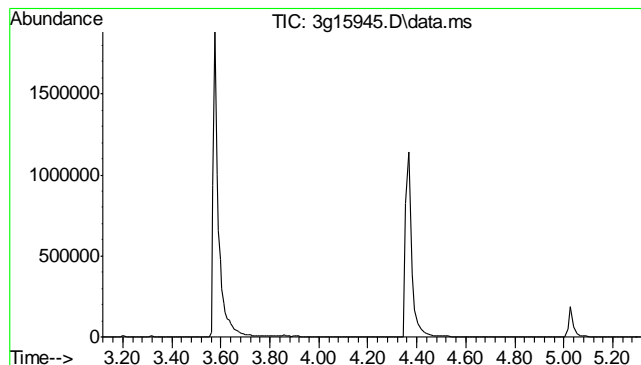
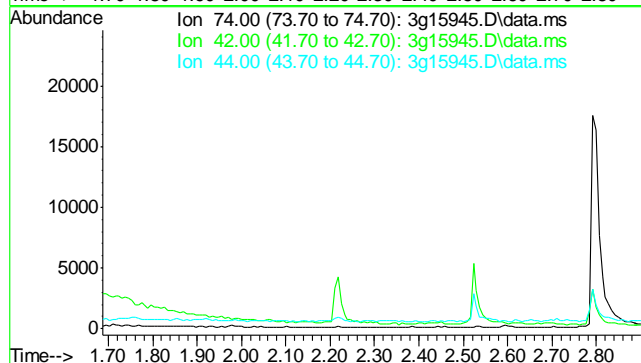




#3  
N-Nitrosodimethylamine  
Concen: N.D. ug/mL  
Expected RT: 1.80 min

Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

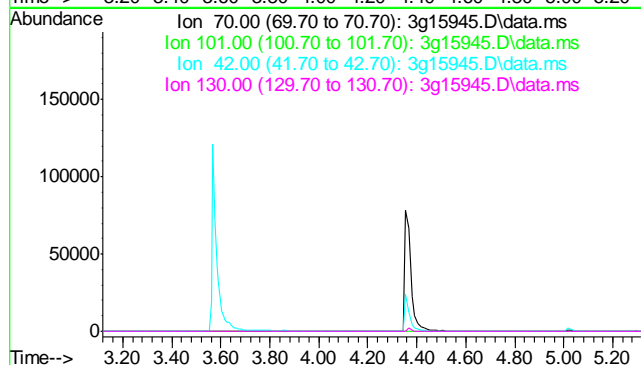
Tgt Ion:	74
Sig	Exp Ratio
74	100
42	78.5
44	4.0

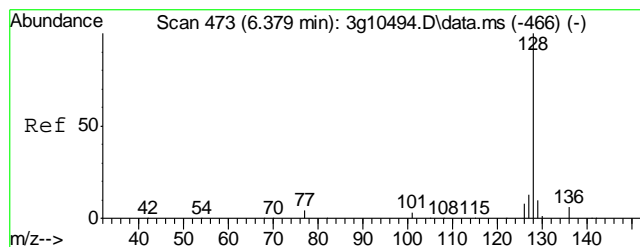


#4  
N-Nitrosodi-propylamine  
Concen: N.D. ug/mL  
Expected RT: 4.22 min

Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

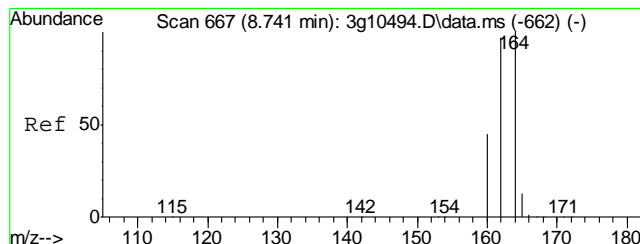
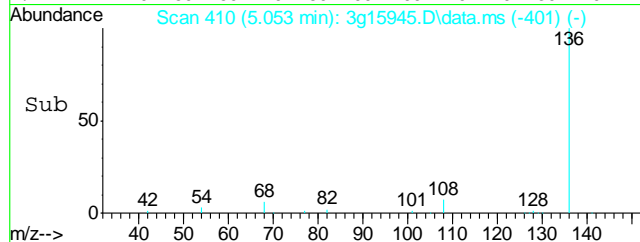
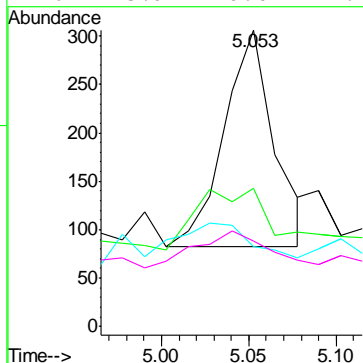
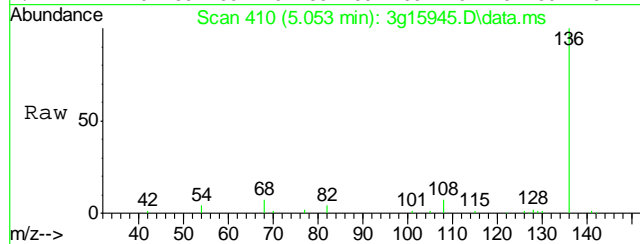
Tgt Ion:	70
Sig	Exp Ratio
70	100
101	11.9
42	57.4
130	21.7





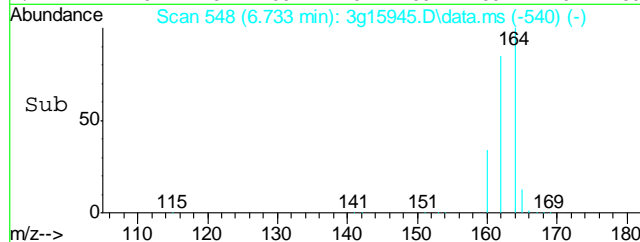
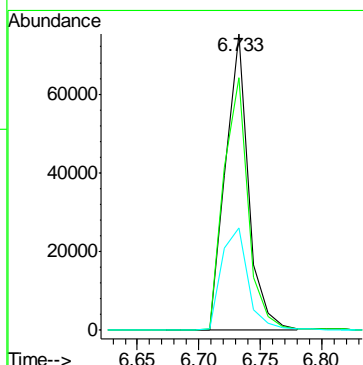
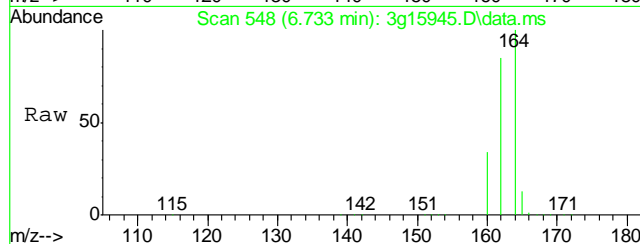
#5  
Naphthalene  
Concen: Below ug/mL  
RT: 5.053 min Scan# 410  
Delta R.T. 0.012 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

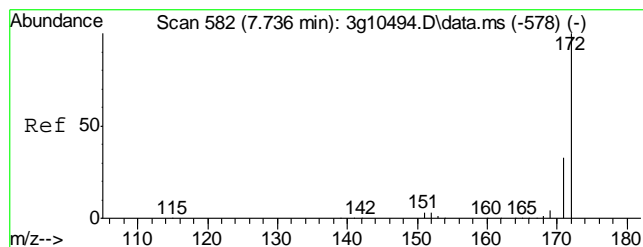
Tgt Ion:128 Resp: 452  
Ion Ratio Lower Upper  
128 100  
129 36.1 0.0 31.2#  
127 36.1 0.0 32.4#  
126 23.9 0.0 27.2



#6  
Acenaphthene-d10  
Concen: 4.0000 ug/mL  
RT: 6.733 min Scan# 548  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

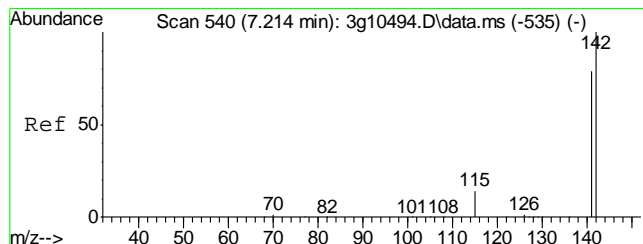
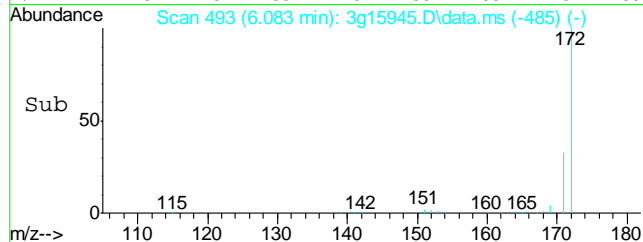
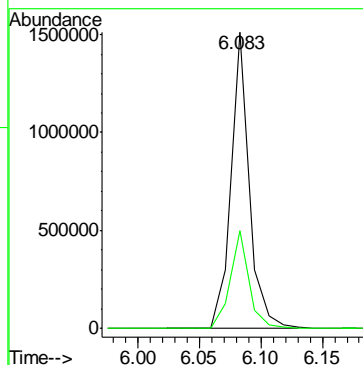
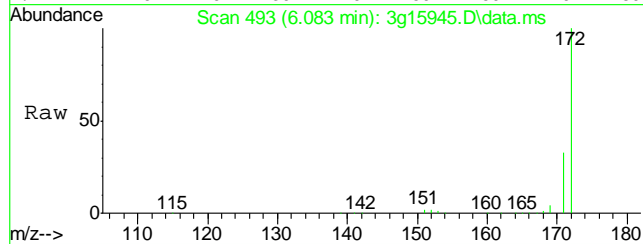
Tgt Ion:164 Resp: 97041  
Ion Ratio Lower Upper  
164 100  
162 90.2 83.7 123.7  
160 39.3 31.9 71.9





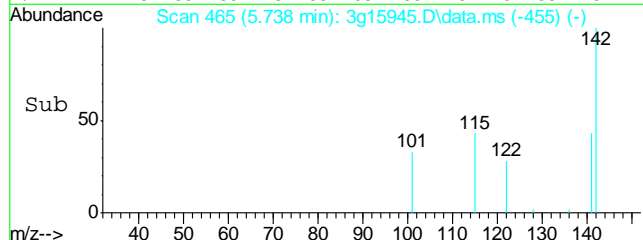
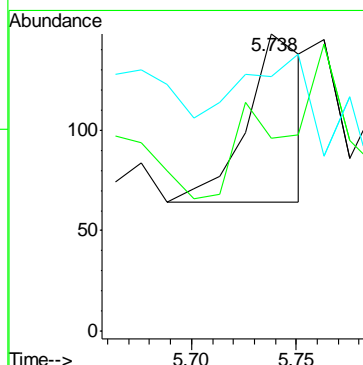
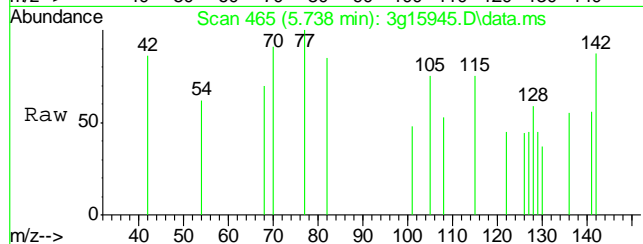
#7  
2-Fluorobiphenyl  
Concen: 44.4328 ug/mL  
RT: 6.083 min Scan# 493  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

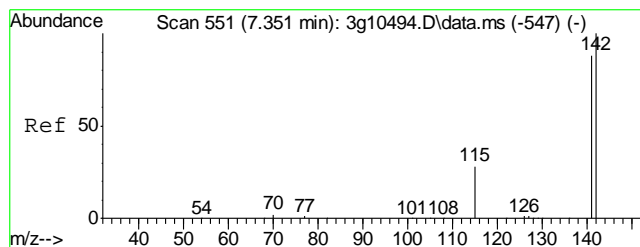
Tgt Ion:172 Resp: 1556529  
Ion Ratio Lower Upper  
172 100  
171 34.0 12.2 52.2



#8  
2-Methylnaphthalene  
Concen: Below ug/mL  
RT: 5.738 min Scan# 465  
Delta R.T. 0.025 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

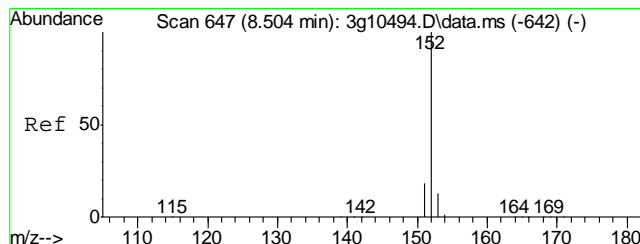
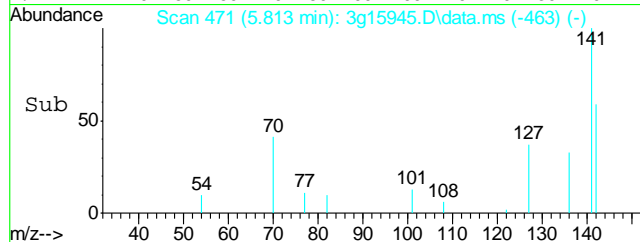
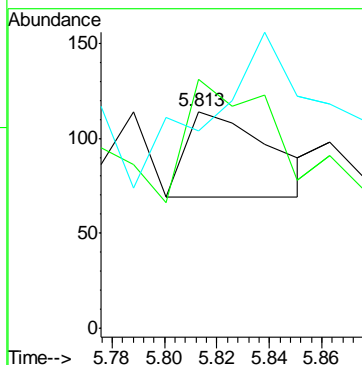
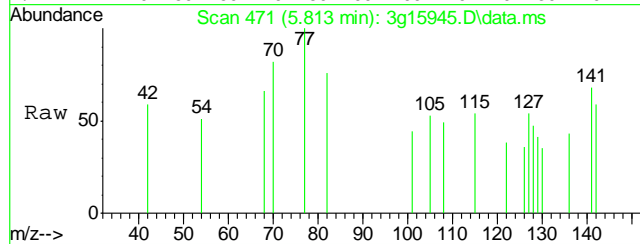
Tgt Ion:142 Resp: 159  
Ion Ratio Lower Upper  
142 100  
141 0.0 62.0 102.0#  
115 74.8 11.3 51.3#





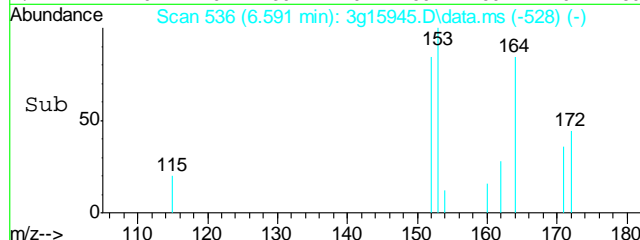
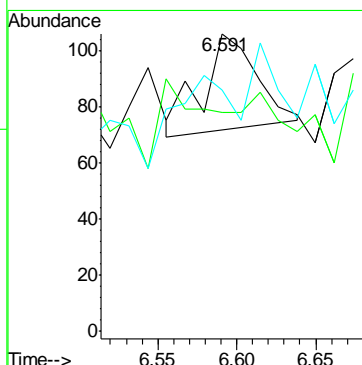
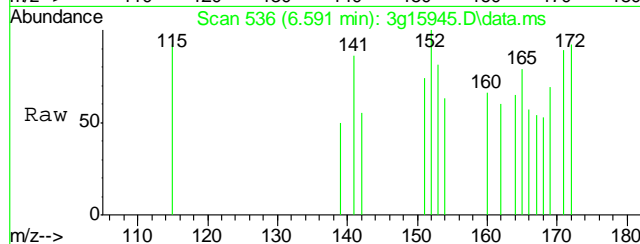
#9  
1-Methylnaphthalene  
Concen: Below ug/mL  
RT: 5.813 min Scan# 471  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

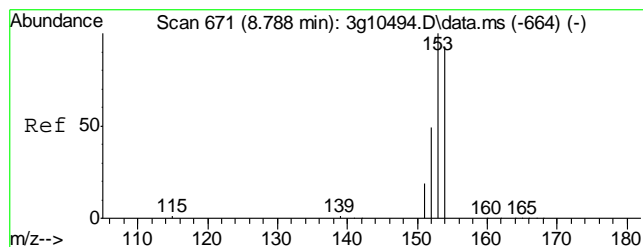
Tgt Ion	142	Resp	99
Ion Ratio	100		
Lower			
Upper			
141	139.4	67.5	107.5#
115	217.2	19.4	59.4#



#10  
Acenaphthylene  
Concen: Below ug/mL  
RT: 6.591 min Scan# 536  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

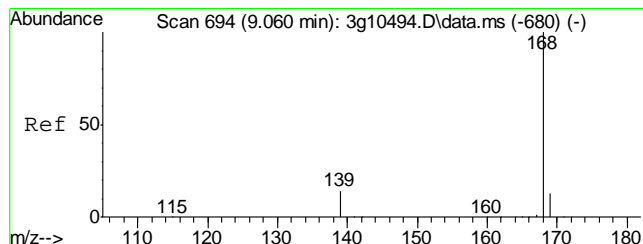
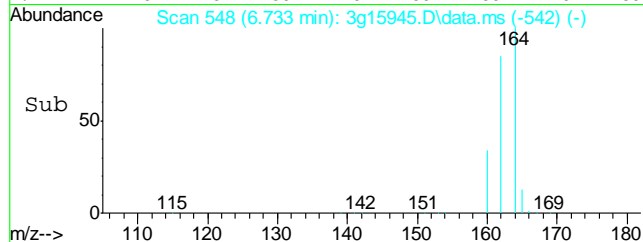
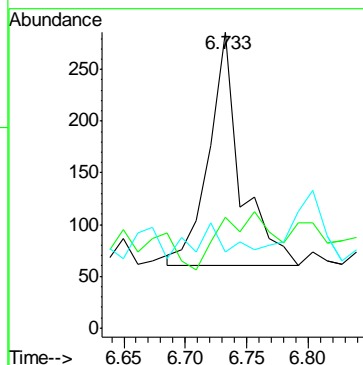
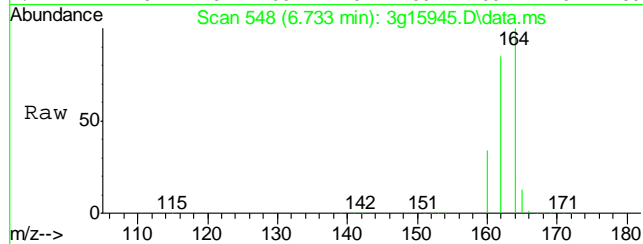
Tgt Ion	152	Resp	82
Ion Ratio <td>100</td> <td></td> <td></td>	100		
Lower <td></td> <td></td> <td></td>			
Upper <td></td> <td></td> <td></td>			
151	0.0	0.0	39.2
153	104.9	0.0	32.9#





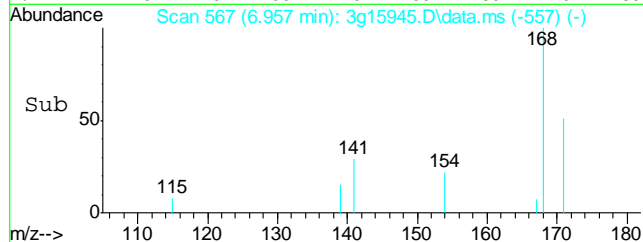
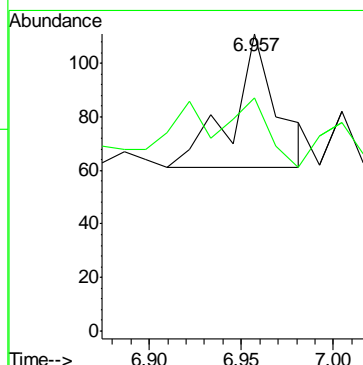
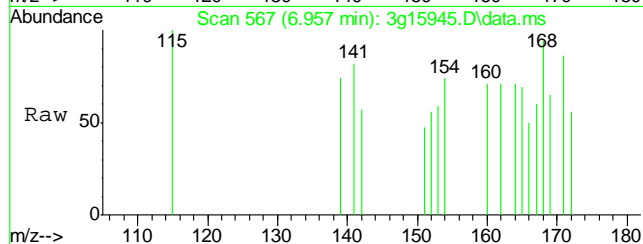
#11  
Acenaphthene  
Concen: Below ug/mL  
RT: 6.733 min Scan# 548  
Delta R.T. -0.024 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

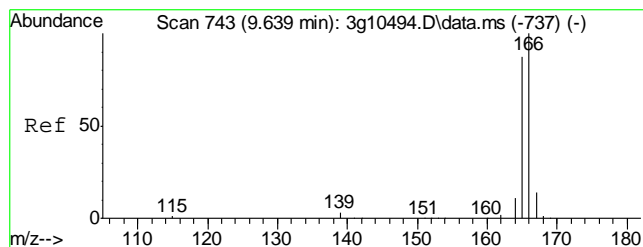
Tgt Ion:154	Resp:	405
Ion Ratio	Lower	Upper
154	100	
153	41.2	82.4 122.4#
152	16.5	30.0 70.0#



#12  
Dibenzofuran  
Concen: Below ug/mL  
RT: 6.957 min Scan# 567  
Delta R.T. 0.024 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

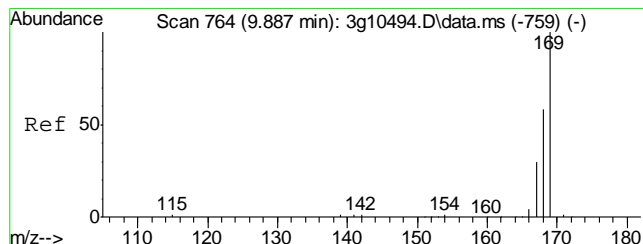
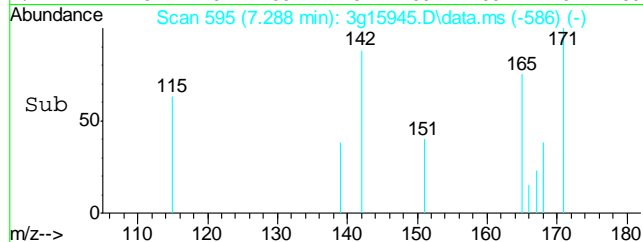
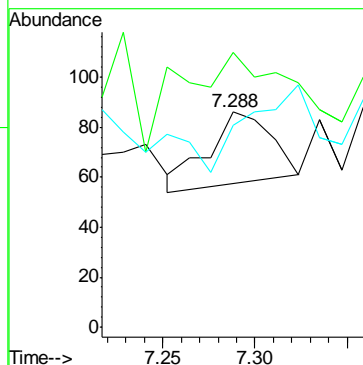
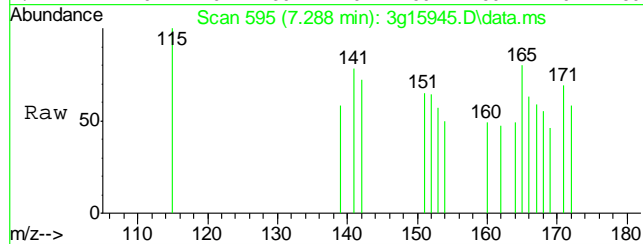
Tgt Ion:168	Resp:	86
Ion Ratio	Lower	Upper
168	100	
139	0.0	13.4 53.4#





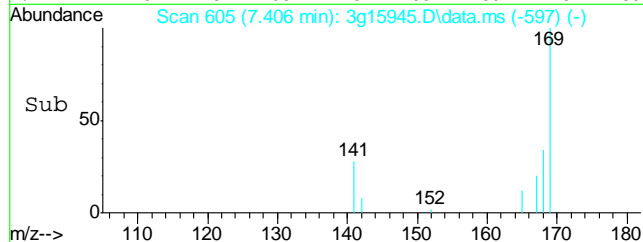
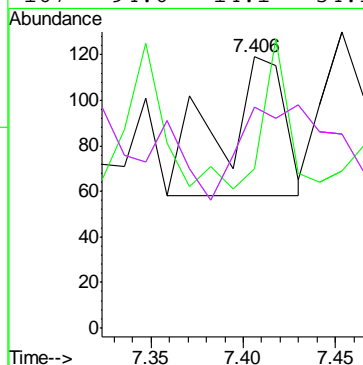
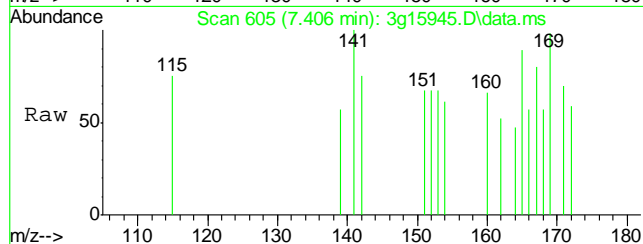
#13  
Fluorene  
Concen: Below ug/mL  
RT: 7.288 min Scan# 595  
Delta R.T. 0.012 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

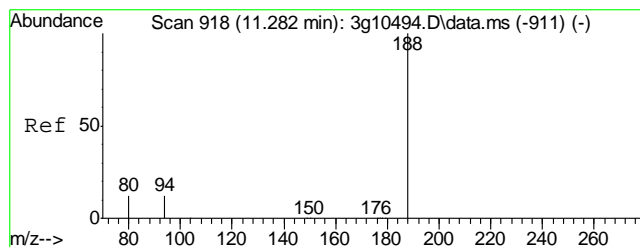
Tgt Ion:	166	Resp:	68
Ion Ratio	Lower	Upper	
166	100		
165	227.9	72.0	112.0#
167	0.0	0.0	33.1



#14  
Diphenylamine  
Concen: Below ug/mL  
RT: 7.406 min Scan# 605  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

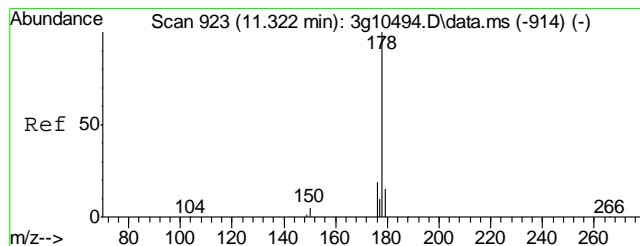
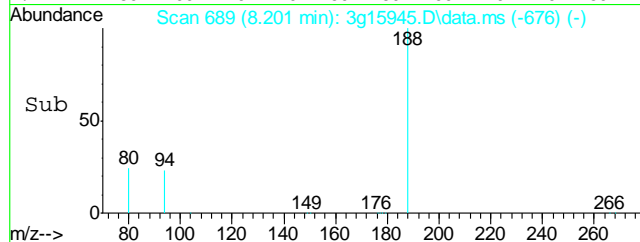
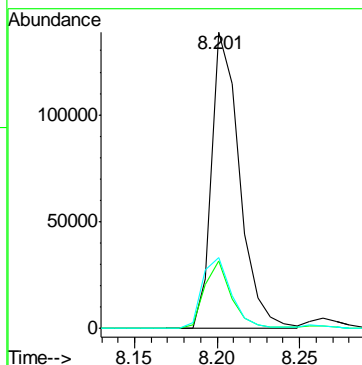
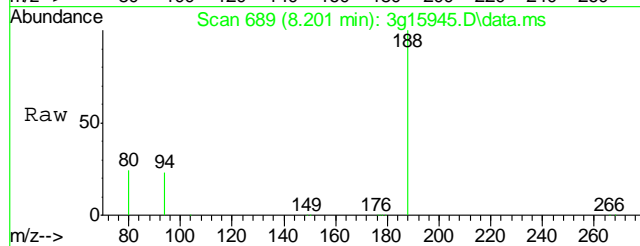
Tgt Ion:	169	Resp:	148
Ion Ratio	Lower	Upper	
169	100		
168	40.5	41.7	81.7#
167	94.6	14.1	54.1#
167	94.6	14.1	54.1#





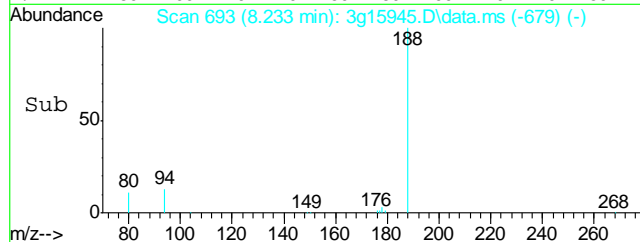
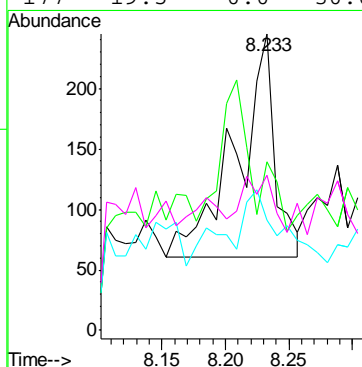
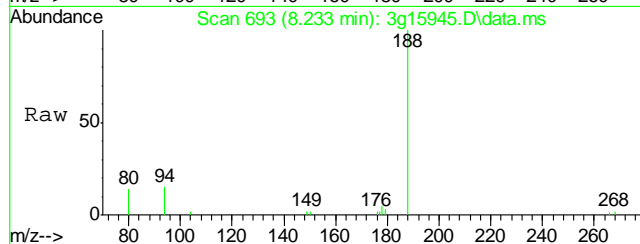
#15  
Phenanthrene-d10  
Concen: 4.0000 ug/mL  
RT: 8.201 min Scan# 689  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

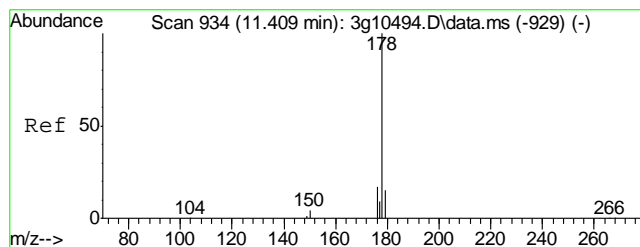
Tgt Ion	Ratio	Lower	Upper
188	100		
94	21.5	0.0	28.3
80	24.7	0.0	27.8



#16  
Phenanthrene  
Concen: Below ug/mL  
RT: 8.233 min Scan# 693  
Delta R.T. 0.008 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

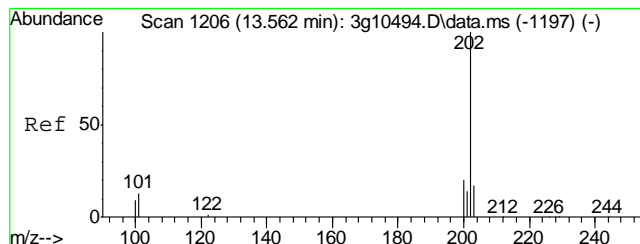
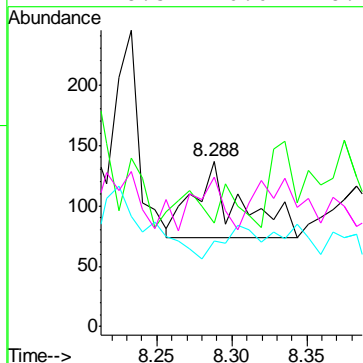
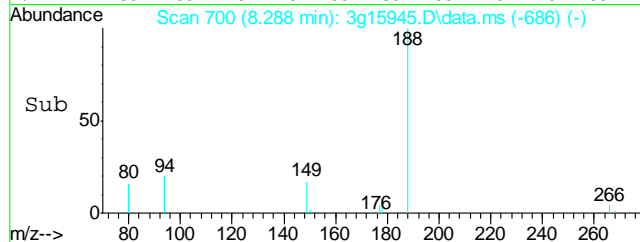
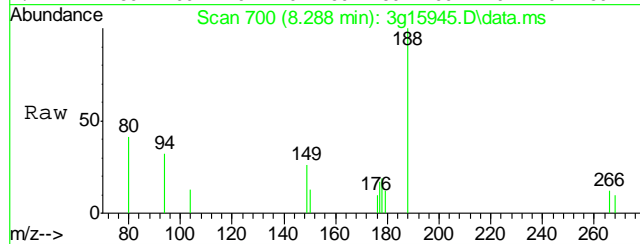
Tgt Ion	Ratio	Lower	Upper
178	100		
179	58.2	0.0	35.2#
176	30.1	0.0	38.6
177	19.5	0.0	30.0





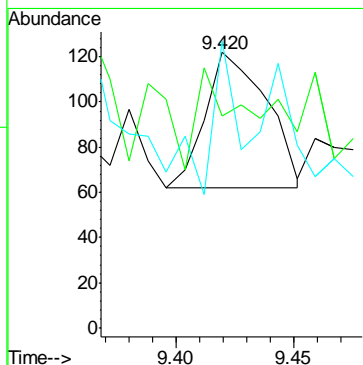
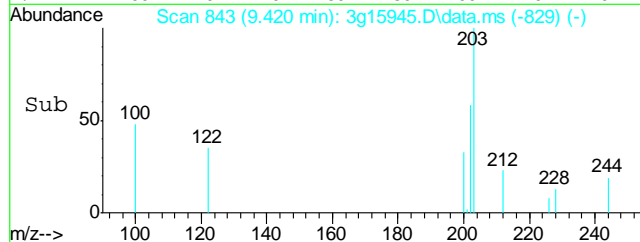
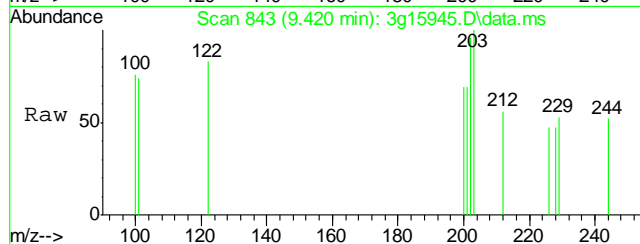
#17  
Anthracene  
Concen: Below ug/mL  
RT: 8.288 min Scan# 700  
Delta R.T. 0.008 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

Tgt Ion	Ratio	Lower	Upper
178	100		
179	22.1	0.0	35.1
176	33.1	0.0	38.2
177	48.5	0.0	28.7#

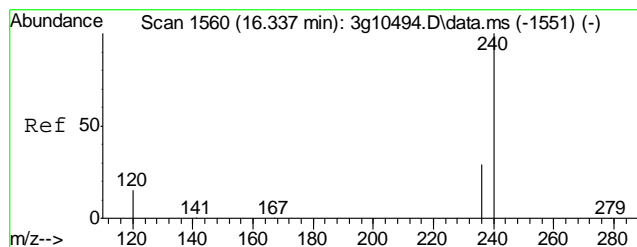


#18  
Fluoranthene  
Concen: Below ug/mL  
RT: 9.420 min Scan# 843  
Delta R.T. 0.008 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

Tgt Ion	Ratio	Lower	Upper
202	100		
101	52.3	0.0	32.6#
203	40.4	0.0	37.4#

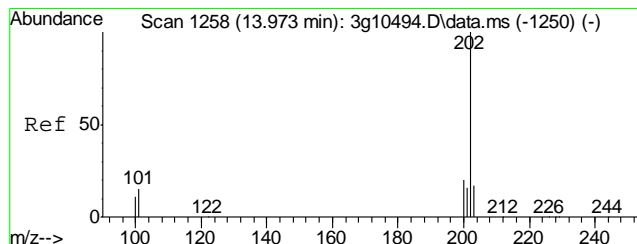
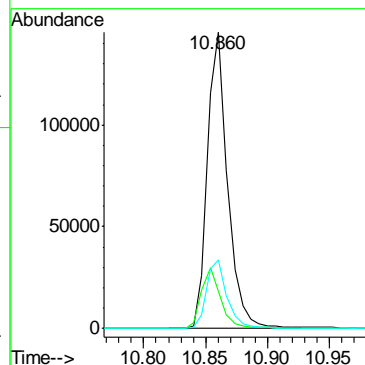
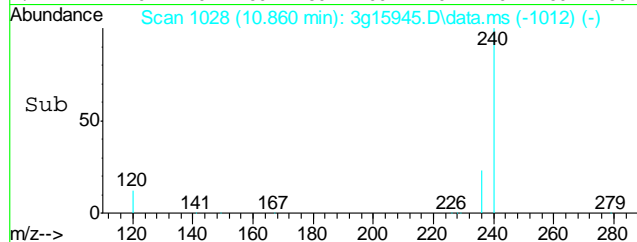
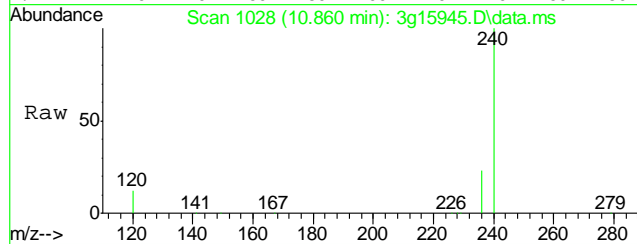






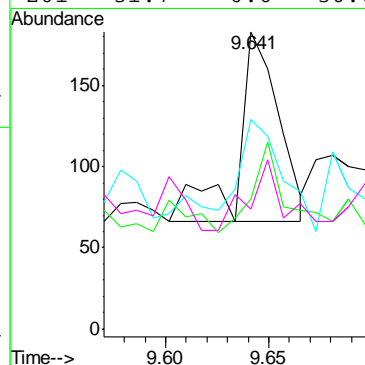
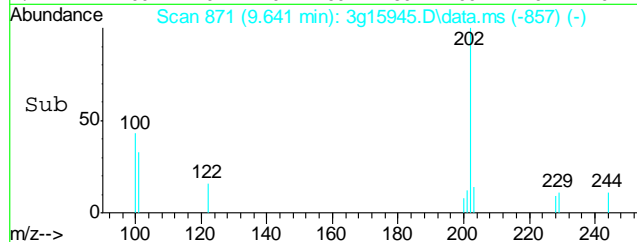
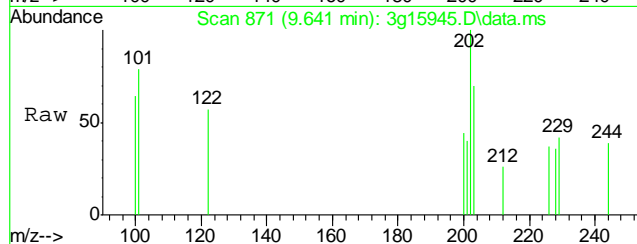
#19  
Chrysene-d12  
Concen: 4.0000 ug/mL  
RT: 10.860 min Scan# 1028  
Delta R.T. 0.007 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

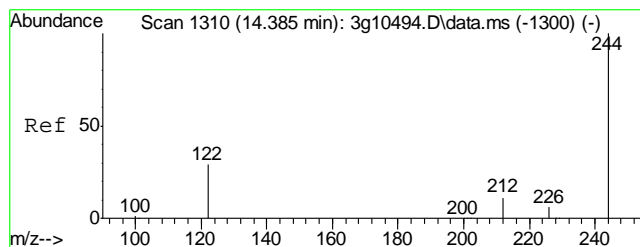
Tgt Ion:	240	Resp:	165436
Ion Ratio	Lower	Upper	
240	100		
120	19.5	0.2	40.2
236	23.2	8.8	48.8



#20  
Pyrene  
Concen: Below ug/mL  
RT: 9.641 min Scan# 871  
Delta R.T. 0.008 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

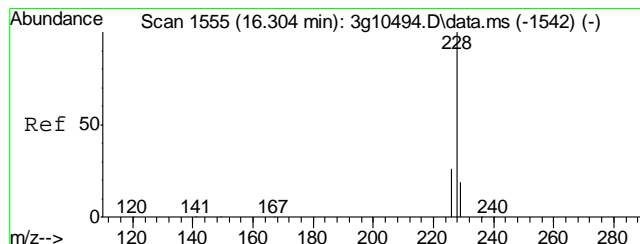
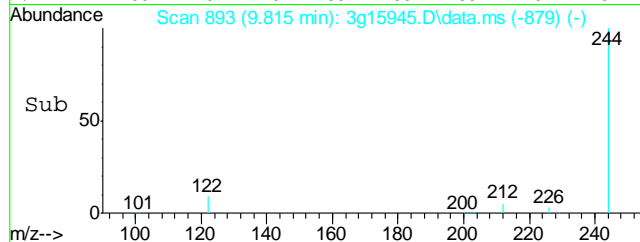
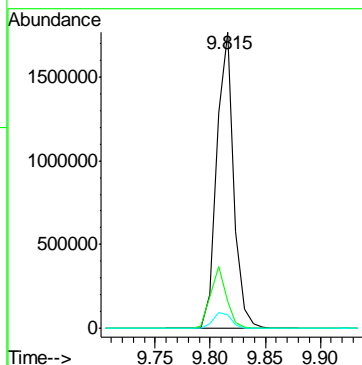
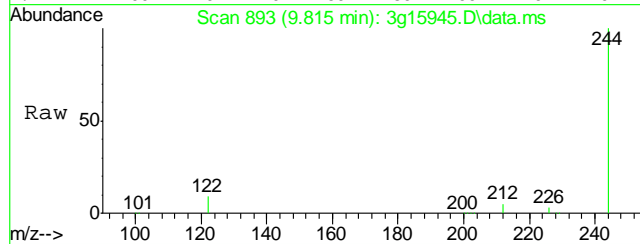
Tgt Ion:	202	Resp:	164
Ion Ratio	Lower	Upper	
202	100		
200	39.6	0.2	40.2
203	61.0	0.0	37.8
201	31.7	0.0	36.6





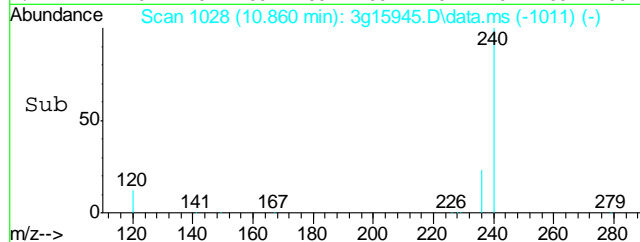
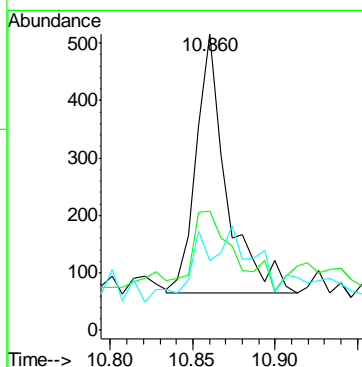
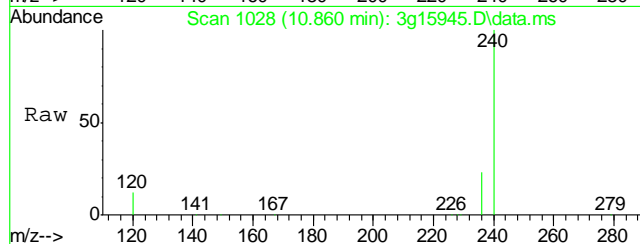
#21  
Terphenyl-d14  
Concen: 52.6571 ug/mL  
RT: 9.815 min Scan# 893  
Delta R.T. 0.008 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

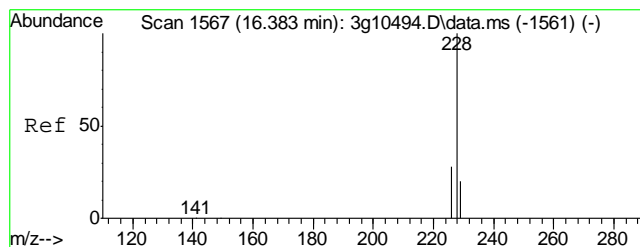
Tgt Ion:244 Resp: 1894689  
Ion Ratio Lower Upper  
244 100  
122 19.3 7.8 47.8  
212 5.8 0.0 32.8



#22  
Benzo(a)anthracene  
Concen: Below ug/mL  
RT: 10.860 min Scan# 1028  
Delta R.T. 0.013 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

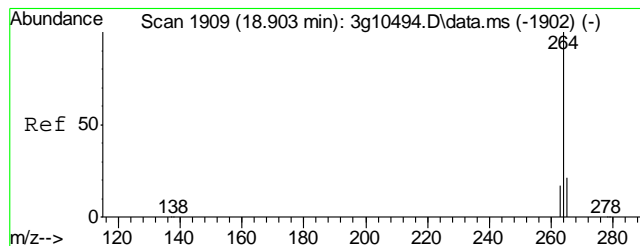
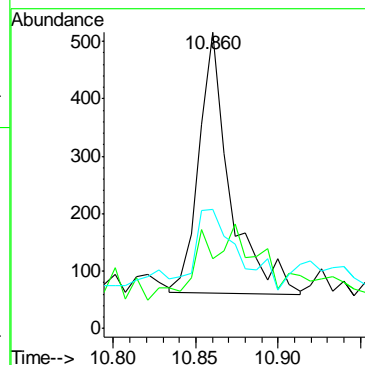
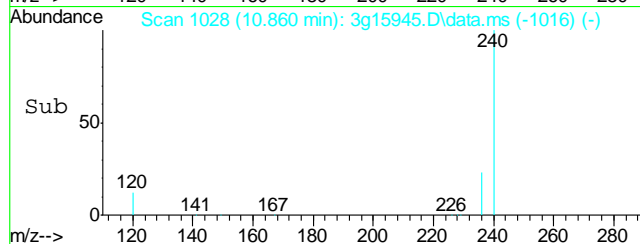
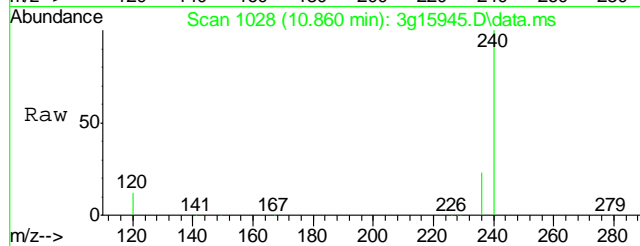
Tgt Ion:228 Resp: 574  
Ion Ratio Lower Upper  
228 100  
229 43.7 0.0 39.4#  
226 39.0 6.6 46.6





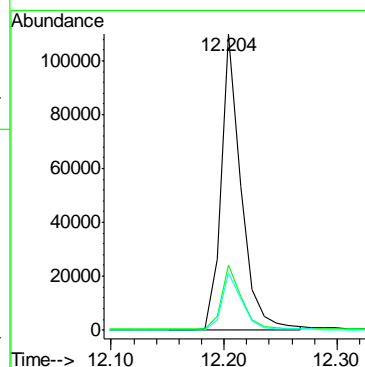
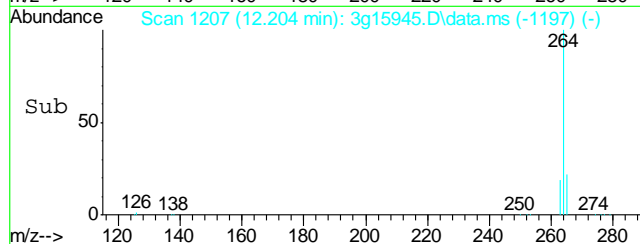
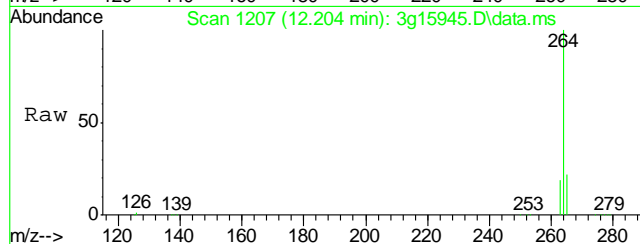
#23  
Chrysene  
Concen: Below ug/mL  
RT: 10.860 min Scan# 1028  
Delta R.T. -0.020 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

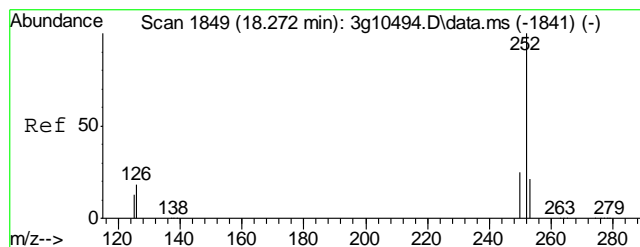
Tgt Ion	228	226	229
Resp	593		
Ratio	100	37.8	42.3
Lower		8.6	0.0
Upper		48.6	39.4



#24  
Perylene-d12  
Concen: 4.0000 ug/mL  
RT: 12.204 min Scan# 1207  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

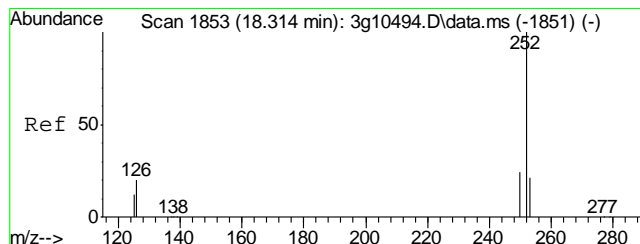
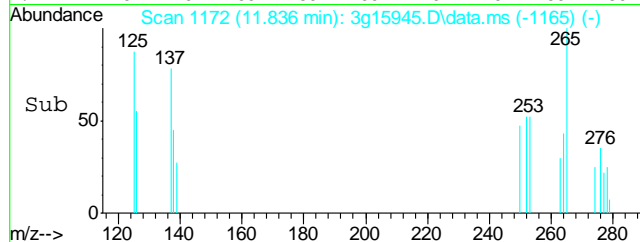
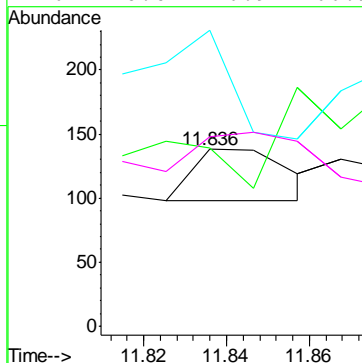
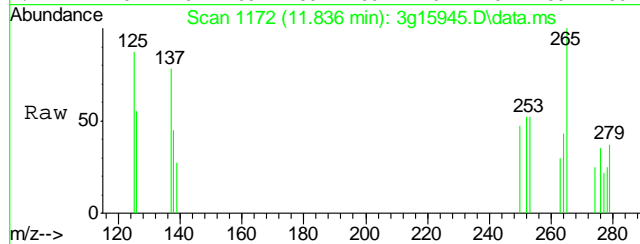
Tgt Ion	264	265	263
Resp	134798		
Ratio	100	21.9	19.5
Lower		1.2	0.7
Upper		41.2	40.7





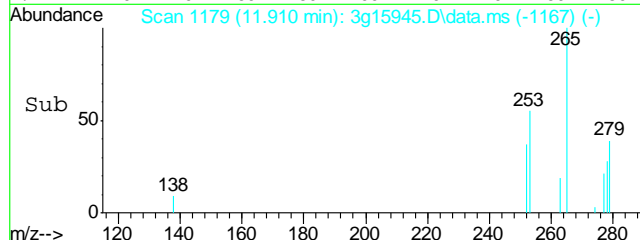
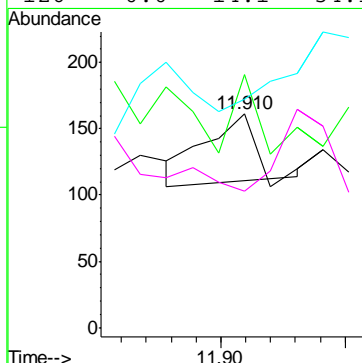
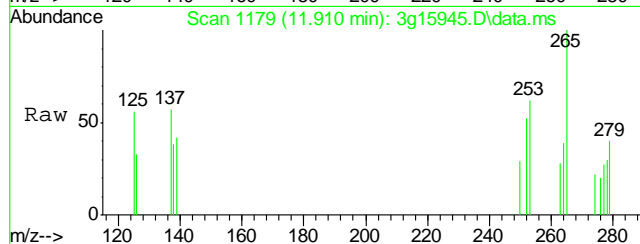
#25  
Benzo(b)fluoranthene  
Concen: Below ug/mL  
RT: 11.836 min Scan# 1172  
Delta R.T. -0.032 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

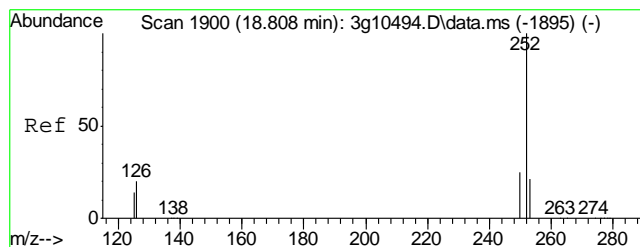
Tgt Ion:	252	Resp:	63
Ion Ratio	Lower	Upper	
252	100		
253	277.8	31.5	71.5#
125	139.7	0.0	33.2#
126	0.0	26.9	66.9#



#26  
Benzo(k)fluoranthene  
Concen: Below ug/mL  
RT: 11.910 min Scan# 1179  
Delta R.T. 0.021 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

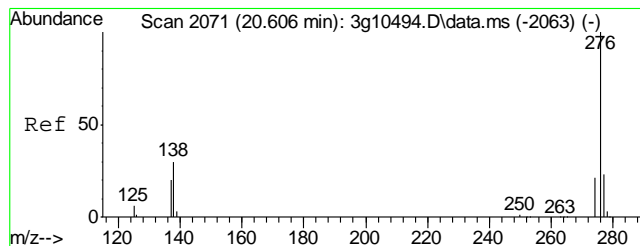
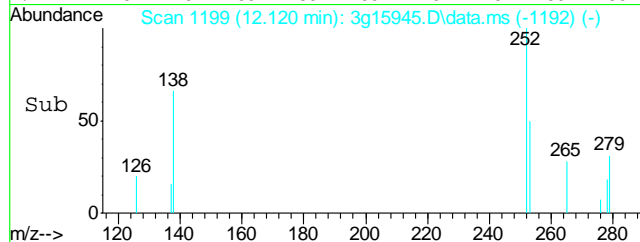
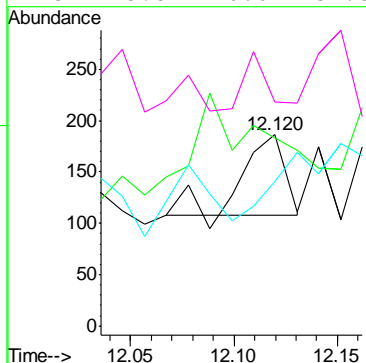
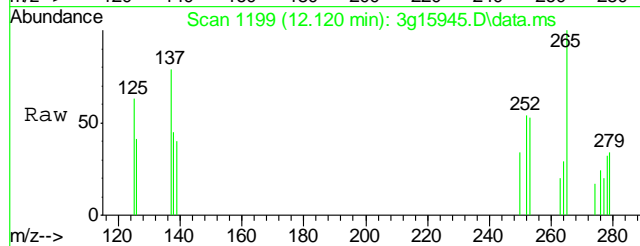
Tgt Ion:	252	Resp:	74
Ion Ratio	Lower	Upper	
252	100		
253	0.0	17.3	57.3#
125	118.9	0.0	29.6#
126	0.0	14.1	54.1#





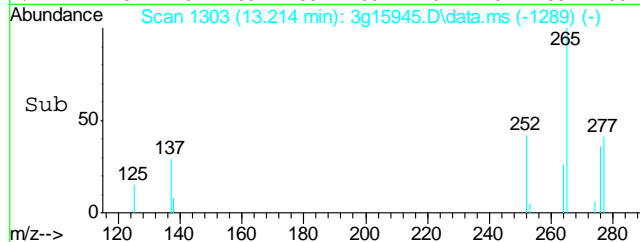
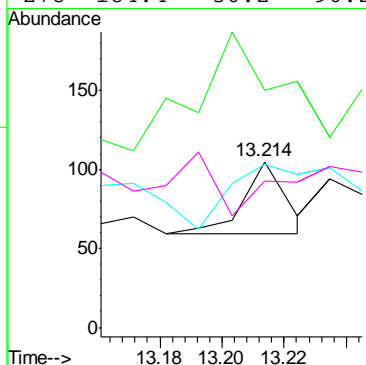
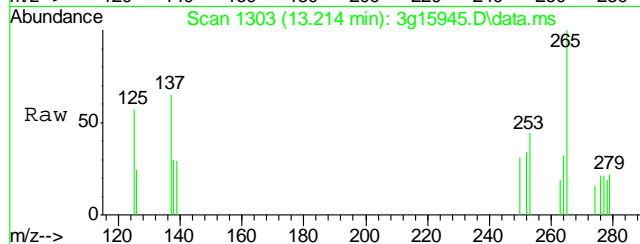
#27  
Benzo(a)pyrene  
Concen: Below ug/mL  
RT: 12.120 min Scan# 1199  
Delta R.T. -0.032 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

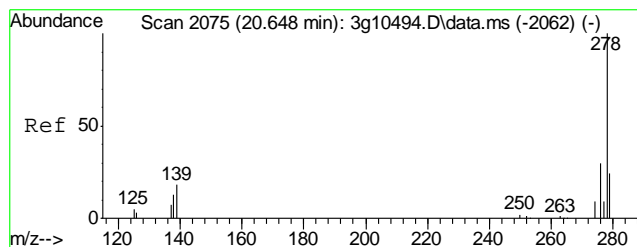
Tgt Ion: 252 Resp: 112  
Ion Ratio Lower Upper  
252 100  
253 0.0 1.5 41.5#  
126 0.0 0.4 40.4#  
125 43.8 0.0 34.5#



#28  
Indeno(1,2,3-cd)pyrene  
Concen: Below ug/mL  
RT: 13.214 min Scan# 1303  
Delta R.T. -0.000 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

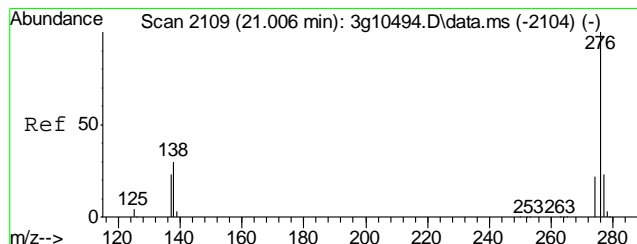
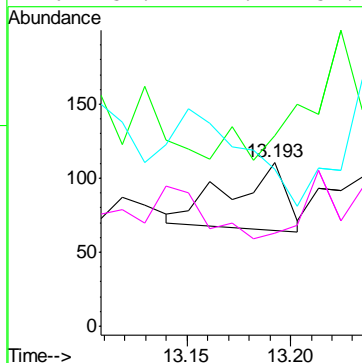
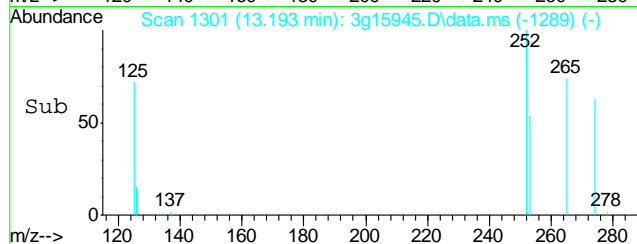
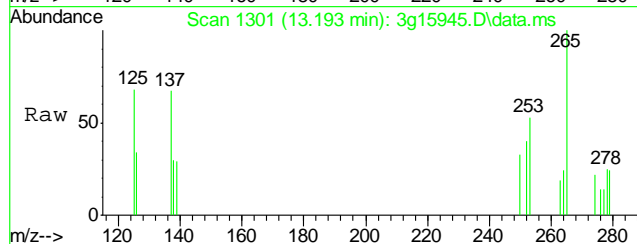
Tgt Ion: 276 Resp: 45  
Ion Ratio Lower Upper  
276 100  
138 311.1 20.0 60.0#  
277 271.1 4.8 44.8#  
278 184.4 56.2 96.2#





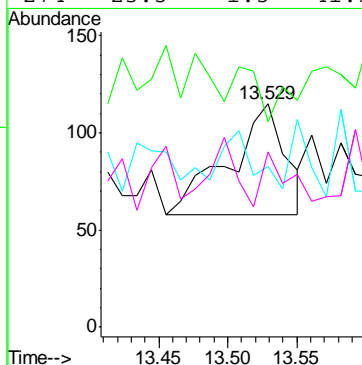
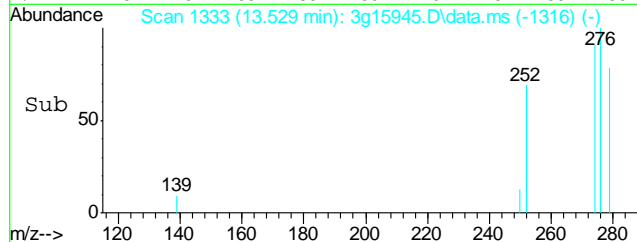
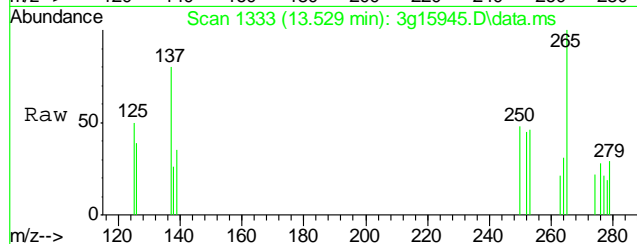
#29  
Dibenzo(a,h)anthracene  
Concen: Below ug/mL  
RT: 13.193 min Scan# 1301  
Delta R.T. -0.021 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

Tgt Ion: 278 Resp: 83  
Ion Ratio Lower Upper  
278 100  
139 242.2 10.8 50.8#  
279 277.1 2.9 42.9#  
276 54.2 111.2 151.2#



#30  
Benzo(g,h,i)perylene  
Concen: Below ug/mL  
RT: 13.529 min Scan# 1333  
Delta R.T. 0.031 min  
Lab File: 3g15945.D  
Acq: 19 Aug 13 11:58 am

Tgt Ion: 276 Resp: 162  
Ion Ratio Lower Upper  
276 100  
138 0.0 15.1 55.1#  
277 21.6 3.3 43.3  
274 23.5 1.5 41.5



## GC Volatiles

### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D49492  
Account: XTOKRWR XTO Energy  
Project: PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB1195-MB	GB21702.D	1	08/16/13	EV	n/a	n/a	GGB1195

The QC reported here applies to the following samples: Method: SW846 8015B

D49492-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	10	5.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	87% 60-140%

10.1.1  
10



Blank Spike Summary

Job Number: D49492  
Account: XTOKRWR XTO Energy  
Project: PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB1195-BS	GB21703.D	1	08/16/13	EV	n/a	n/a	GGB1195

The QC reported here applies to the following samples: Method: SW846 8015B

D49492-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	110	108	98	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	97%	60-140%

\* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D49413-1MS	GB21705.D	1	08/16/13	EV	n/a	n/a	GGB1195
D49413-1MSD	GB21706.D	1	08/16/13	EV	n/a	n/a	GGB1195
D49413-1 <sup>a</sup>	GB21704.D	1	08/16/13	EV	n/a	n/a	GGB1195

The QC reported here applies to the following samples:

Method: SW846 8015B

D49492-1

CAS No.	Compound	D49413-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	19.0		142	158	98	159	98	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D49413-1	Limits
120-82-1	1,2,4-Trichlorobenzene	110%	120%	93%	60-140%

(a) Confirmation run.

\* = Outside of Control Limits.

GC Volatiles

Raw Data



Quantitation Report (QT Reviewed)

Signal #1 : Y:\1\DATA\081613\GB21708.D\FID1A.CH Vial: 9  
Signal #2 : Y:\1\DATA\081613\GB21708.D\FID2B.CH  
Acq On : 16 Aug 2013 2:54 pm Operator: ELISEV  
Sample : D49492-1 Inst : GC/MS Ins  
Misc : GC3809,GGB1195,5.041,,100,5,1 Multiplr: 1.00  
IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E  
Quant Time: Aug 16 15:10:05 2013 Quant Results File: TB1125GB1125SOIL.RES

Quant Method : C:\MSDCHEM\1...\TB1125GB1125SOIL.M (Chemstation Integrator)  
Title : 8015B/8021B TVH/BTEX  
Last Update : Fri Aug 16 15:06:06 2013  
Response via : Initial Calibration  
DataAcq Meth : TVB4.M

Volume Inj. :  
Signal #1 Phase : DB-624 Signal #2 Phase: DB-624  
Signal #1 Info : 0.53 mm Signal #2 Info : 0.53 mm

Compound		R.T.	Response	Conc Units	
-----					
System Monitoring Compounds					
2) S	1,2,4-Trichlorobenzene	14.43	2593498	85.846 %	m
10) S	1,2,4-Trichlorobenzene (P)	14.43	12703600	96.204 %	m
Target Compounds					
1) H	TVH-Gasoline	7.27	3563951	0.051 mg/L	
4) T	Methyl-t-butyl-ether	0.00	0	N.D. ug/L	d
5) T	Benzene	0.00	0	N.D. ug/L	d
6) T	Toluene	7.75	105709	0.286 ug/L	m
7) T	Ethylbenzene	0.00	0	N.D. ug/L	d
8) T	m,p-Xylene	10.54	115053	0.305 ug/L	m
9) T	o-Xylene	0.00	0	N.D. ug/L	d
11) T	Naphthalene	14.43	12694761	73.661 ug/L	m

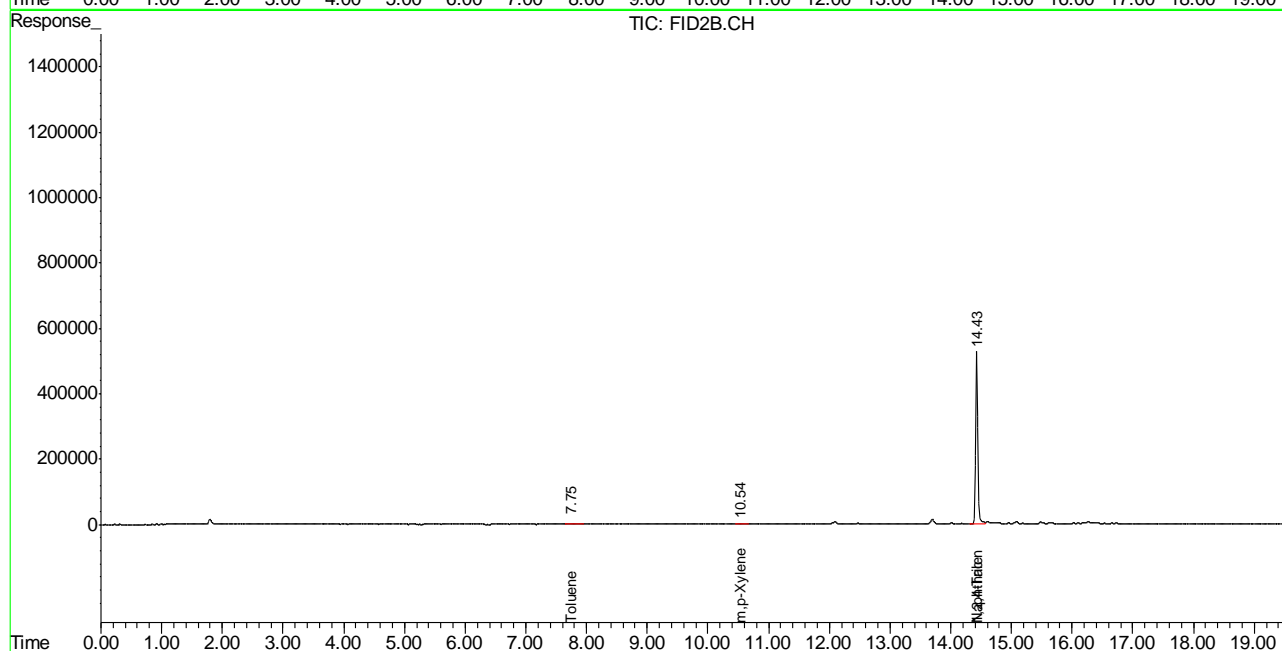
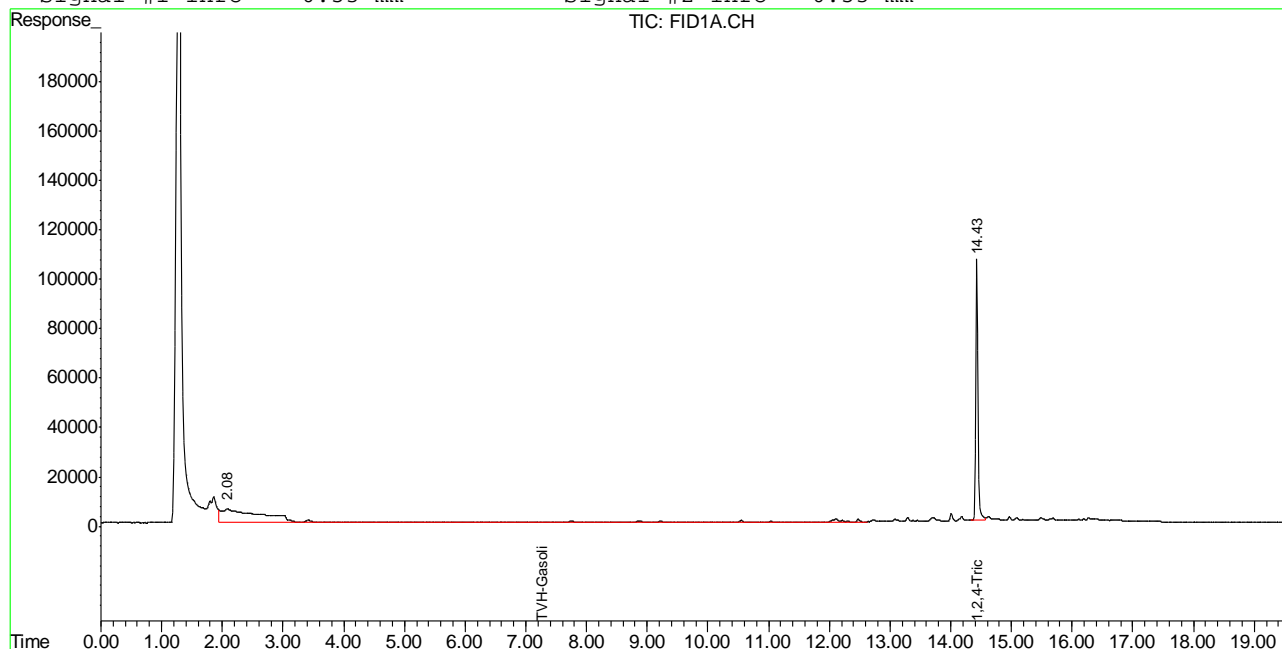
11.1.1  
11

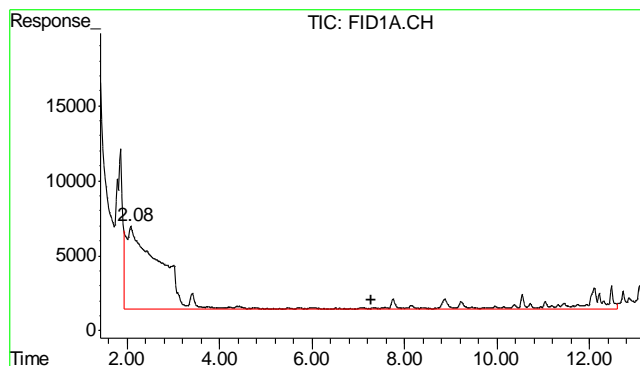
Quantitation Report (QT Reviewed)

Signal #1 : Y:\1\DATA\081613\GB21708.D\FID1A.CH Vial: 9  
 Signal #2 : Y:\1\DATA\081613\GB21708.D\FID2B.CH  
 Acq On : 16 Aug 2013 2:54 pm Operator: ELISEV  
 Sample : D49492-1 Inst : GC/MS Ins  
 Misc : GC3809,GGB1195,5.041,,100,5,1 Multiplr: 1.00  
 IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E  
 Quant Time: Aug 16 15:17 2013 Quant Results File: TB1125GB1125SOIL.RES

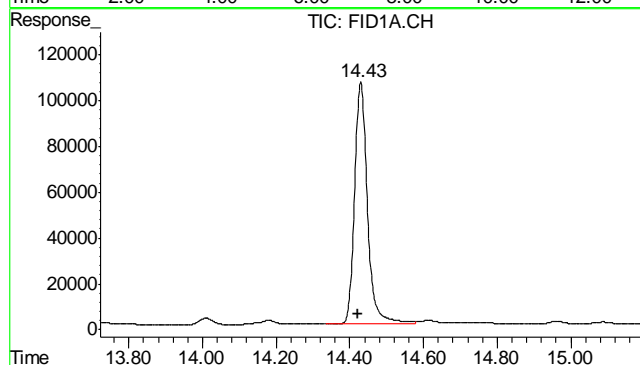
Quant Method : C:\MSDCHEM\1...\TB1125GB1125SOIL.M (Chemstation Integrator)  
 Title : 8015B/8021B TVH/BTEX  
 Last Update : Fri Aug 16 15:06:06 2013  
 Response via : Multiple Level Calibration  
 DataAcq Meth : TVB4.M

Volume Inj. :  
 Signal #1 Phase : DB-624 Signal #2 Phase: DB-624  
 Signal #1 Info : 0.53 mm Signal #2 Info : 0.53 mm

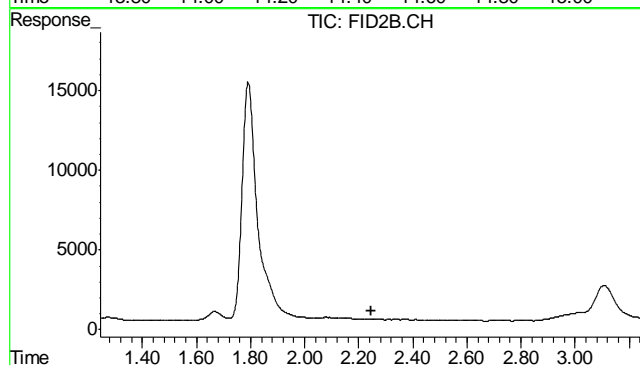




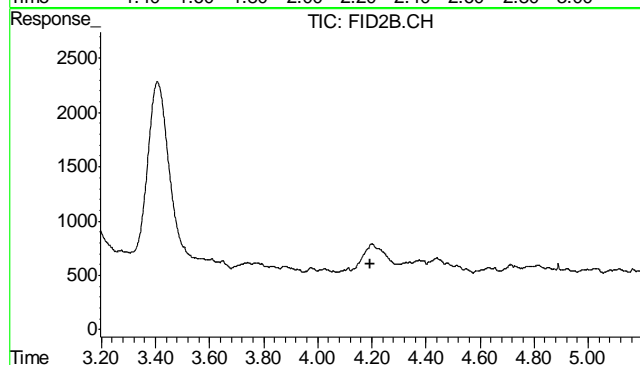
#1 TVH-Gasoline  
 R.T.: 7.270 min  
 Delta R.T.: 0.000 min  
 Response: 3563951  
 Conc: 0.05 mg/L m



#2 1,2,4-Trichlorobenzene  
 R.T.: 14.429 min  
 Delta R.T.: 0.006 min  
 Response: 2593498  
 Conc: 85.85 % m

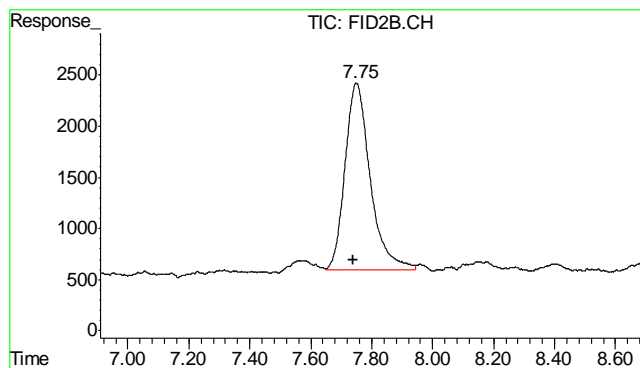


#4 Methyl-t-butyl-ether  
 R.T.: 0.000 min  
 Exp R.T.: 2.244 min  
 Response: 0  
 Conc: N.D.



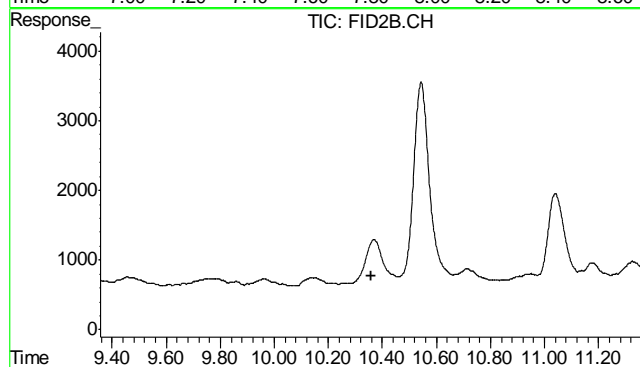
#5 Benzene  
 R.T.: 0.000 min  
 Exp R.T.: 4.196 min  
 Response: 0  
 Conc: N.D.

11.1.1



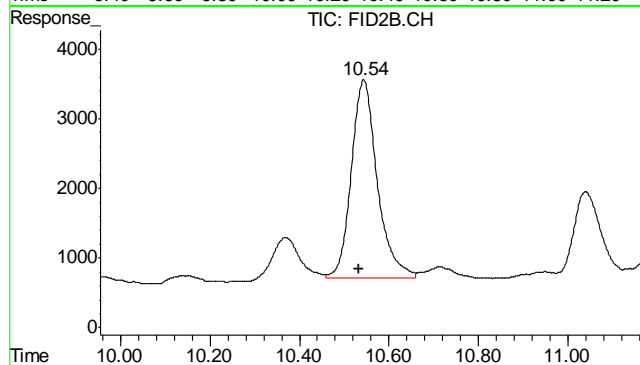
#6 Toluene

R.T.: 7.749 min  
Delta R.T.: 0.010 min  
Response: 105709  
Conc: 0.29 ug/L m



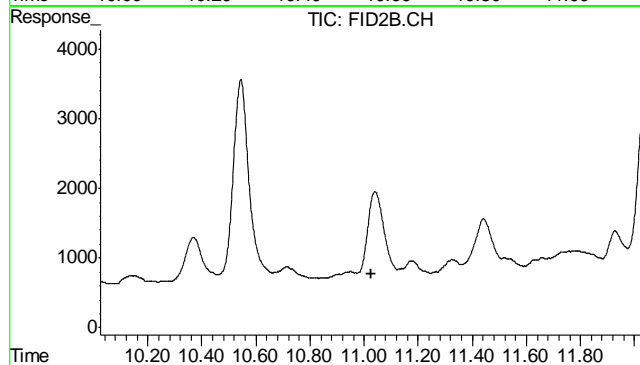
#7 Ethylbenzene

R.T.: 0.000 min  
Exp R.T.: 10.357 min  
Response: 0  
Conc: N.D.



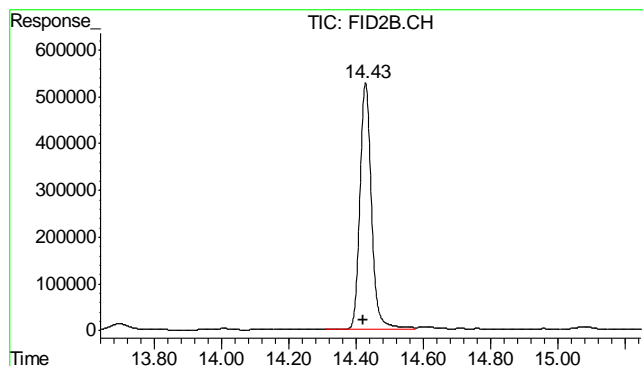
#8 m,p-Xylene

R.T.: 10.543 min  
Delta R.T.: 0.009 min  
Response: 115053  
Conc: 0.30 ug/L m



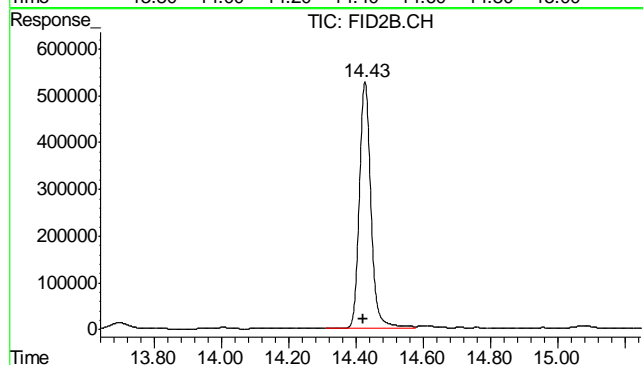
#9 o-Xylene

R.T.: 0.000 min  
Exp R.T.: 11.025 min  
Response: 0  
Conc: N.D.



#10 1,2,4-Trichlorobenzene (P)

R.T.: 14.427 min  
 Delta R.T.: 0.006 min  
 Response: 12703600  
 Conc: 96.20 % m



#11 Naphthalene

R.T.: 14.427 min  
 Delta R.T.: 0.006 min  
 Response: 12694761  
 Conc: 73.66 ug/L m

11.1.1  
11



Judy Melson  
08/16/13 14:12

## Quantitation Report (QT Reviewed)

Signal #1 : Y:\1\DATA\081613\GB21702.D\FID1A.CH Vial: 3  
Signal #2 : Y:\1\DATA\081613\GB21702.D\FID2B.CH  
Acq On : 16 Aug 2013 11:16 am Operator: ELISEV  
Sample : MB, S Inst : GC/MS Ins  
Misc : GC3809,GGB1195,5.000,,100,5,1 Multiplr: 1.00  
IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E  
Quant Time: Aug 16 12:26:31 2013 Quant Results File: TB1125GB1125SOIL.RES

Quant Method : C:\MSDCHEM\1...\TB1125GB1125SOIL.M (Chemstation Integrator)  
Title : 8015B/8021B TVH/BTEX  
Last Update : Fri Aug 16 12:26:14 2013  
Response via : Initial Calibration  
DataAcq Meth : TVB4.M

Volume Inj. :  
Signal #1 Phase : DB-624 Signal #2 Phase: DB-624  
Signal #1 Info : 0.53 mm Signal #2 Info : 0.53 mm

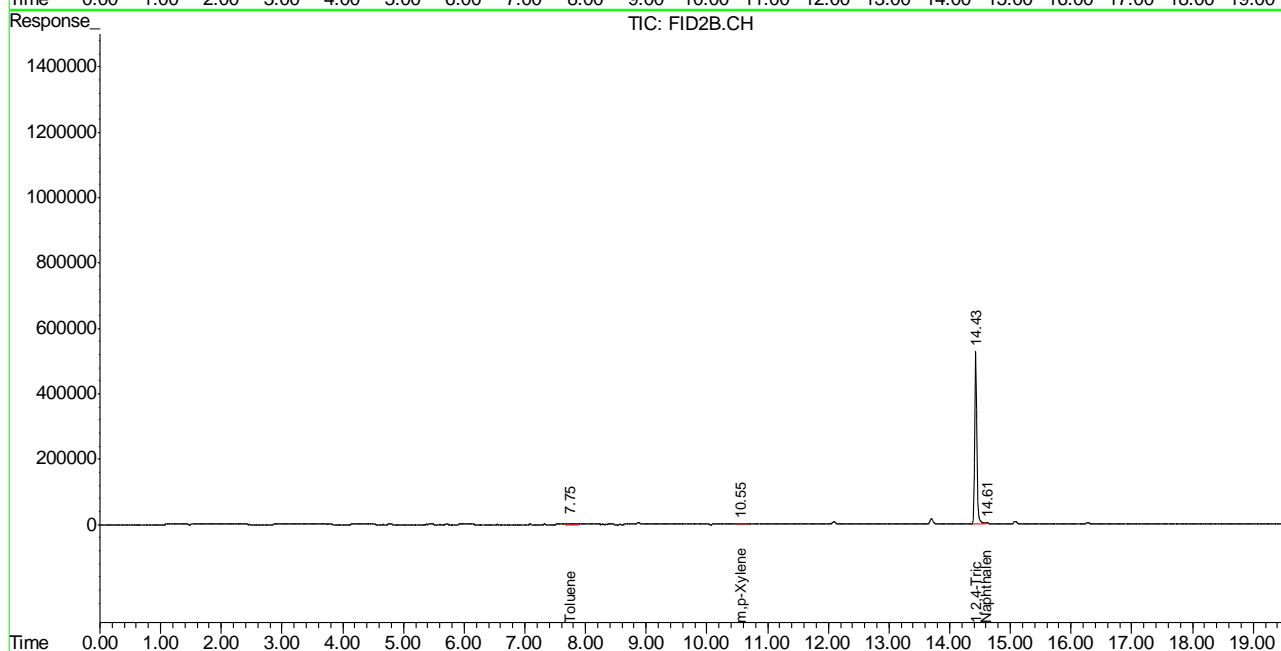
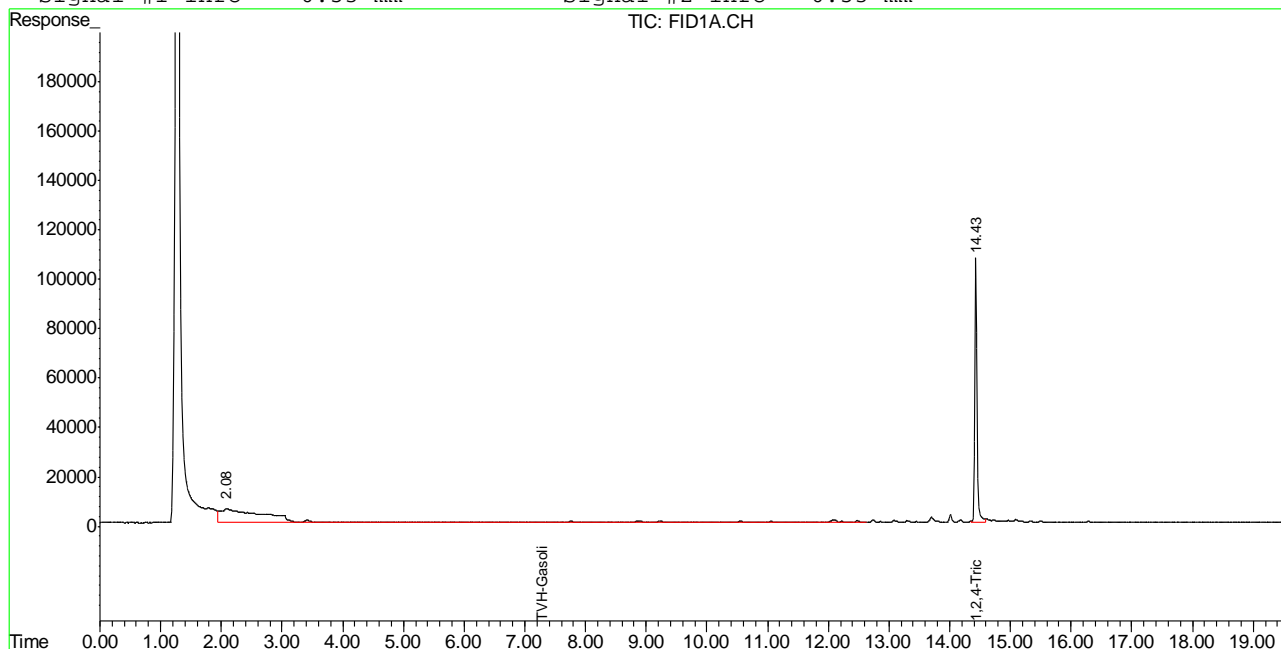
Compound		R.T.	Response	Conc Units	
-----					
System Monitoring Compounds					
2) S	1,2,4-Trichlorobenzene	14.43	2629308	87.031 %	m
10) S	1,2,4-Trichlorobenzene (P)	14.43	12734496	96.438 %	m
Target Compounds					
1) H	TVH-Gasoline	7.27	3653194	0.052	mg/L
4) T	Methyl-t-butyl-ether	0.00	0	N.D.	ug/L d
5) T	Benzene	0.00	0	N.D.	ug/L d
6) T	Toluene	7.75	101433	0.274	ug/L m
7) T	Ethylbenzene	0.00	0	N.D.	ug/L d
8) T	m,p-Xylene	10.55	106227	0.281	ug/L m
9) T	o-Xylene	0.00	0	N.D.	ug/L d
11) T	Naphthalene	14.61	30442	0.177	uq/L m

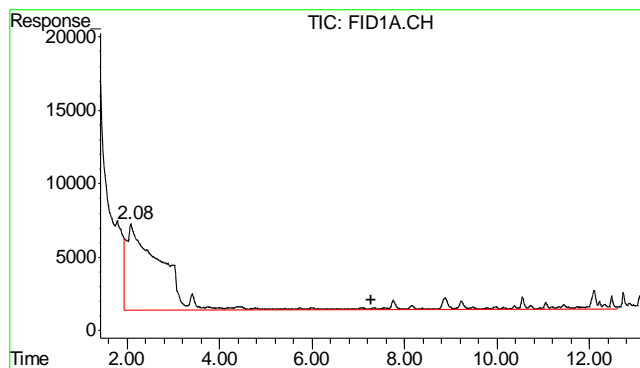
## Quantitation Report (QT Reviewed)

Signal #1 : Y:\1\DATA\081613\GB21702.D\FID1A.CH Vial: 3  
Signal #2 : Y:\1\DATA\081613\GB21702.D\FID2B.CH  
Acq On : 16 Aug 2013 11:16 am Operator: ELISEV  
Sample : MB, S Inst : GC/MS Ins  
Misc : GC3809,GGB1195,5.000,,100,5,1 Multiplr: 1.00  
IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E  
Quant Time: Aug 16 12:34 2013 Quant Results File: TB1125GB1125SOIL.RES

Quant Method : C:\MSDCHEM\1...\TB1125GB1125SOIL.M (Chemstation Integrator)  
Title : 8015B/8021B TVH/BTEX  
Last Update : Fri Aug 16 12:26:14 2013  
Response via : Multiple Level Calibration  
DataAcq Meth : TVB4.M

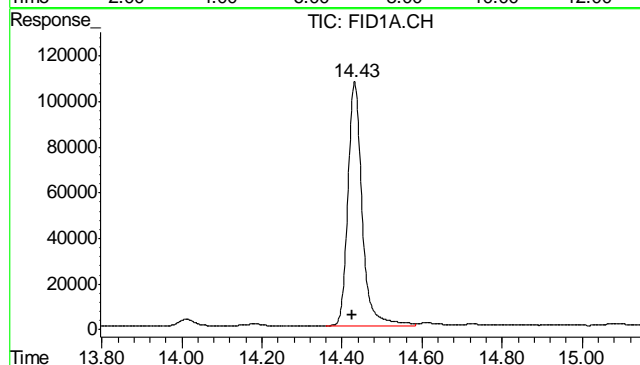
Volume Inj. :  
Signal #1 Phase : DB-624 Signal #2 Phase: DB-624  
Signal #1 Info : 0.53 mm Signal #2 Info : 0.53 mm





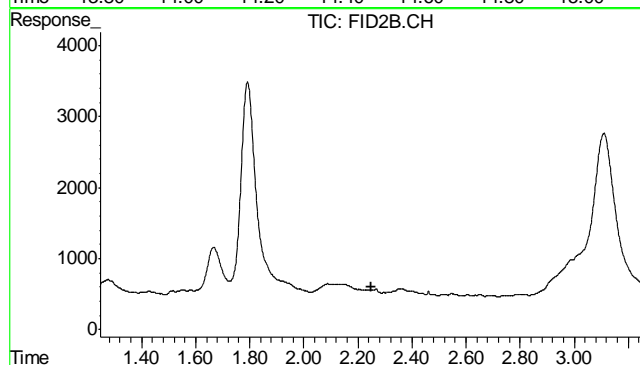
#1 TVH-Gasoline

R.T.: 7.270 min  
Delta R.T.: 0.000 min  
Response: 3653194  
Conc: 0.05 mg/L m



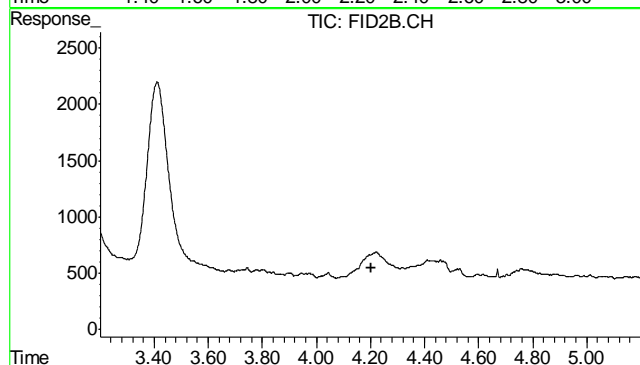
#2 1,2,4-Trichlorobenzene

R.T.: 14.431 min  
Delta R.T.: 0.006 min  
Response: 2629308  
Conc: 87.03 % m



#4 Methyl-t-butyl-ether

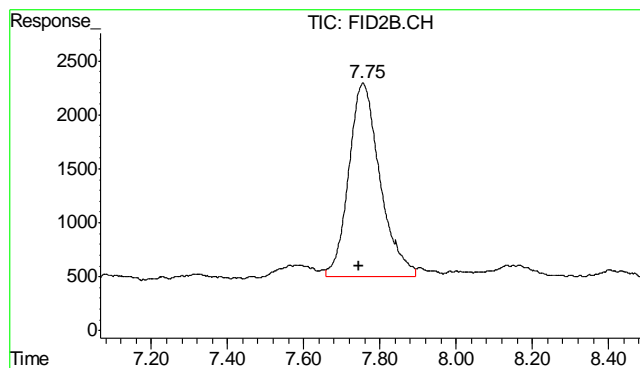
R.T.: 0.000 min  
Exp R.T.: 2.248 min  
Response: 0  
Conc: N.D.



#5 Benzene

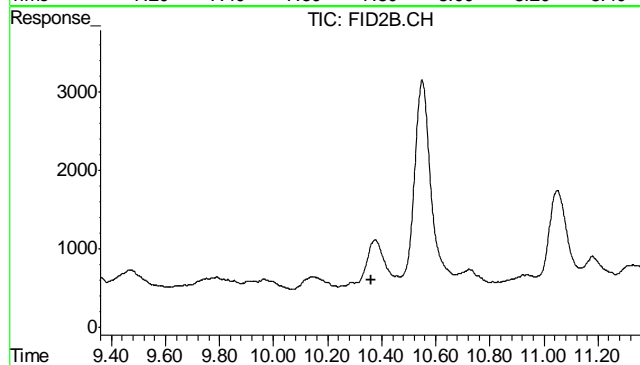
R.T.: 0.000 min  
Exp R.T.: 4.201 min  
Response: 0  
Conc: N.D.

11.21  
11



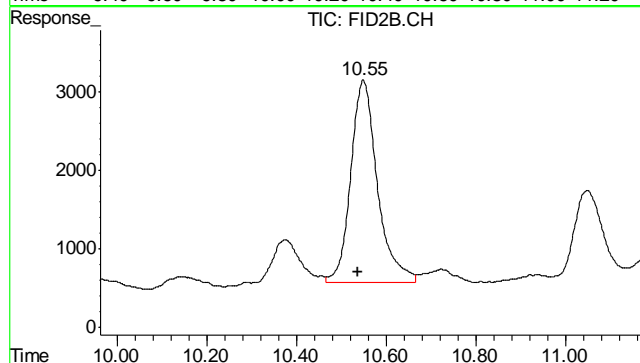
#6 Toluene

R.T.: 7.755 min  
Delta R.T.: 0.011 min  
Response: 101433  
Conc: 0.27 ug/L m



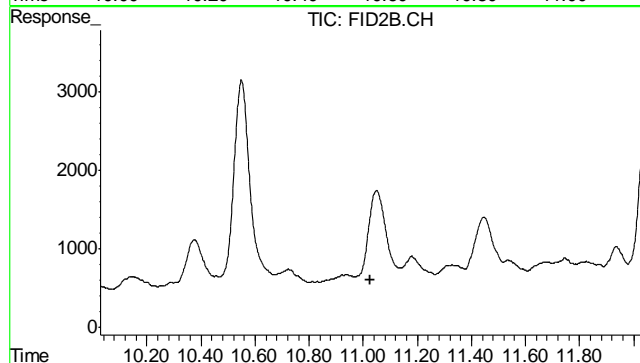
#7 Ethylbenzene

R.T.: 0.000 min  
Exp R.T.: 10.359 min  
Response: 0  
Conc: N.D.



#8 m,p-Xylene

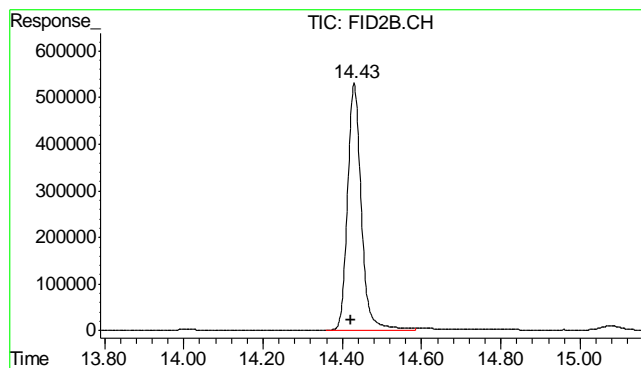
R.T.: 10.548 min  
Delta R.T.: 0.010 min  
Response: 106227  
Conc: 0.28 ug/L m



#9 o-Xylene

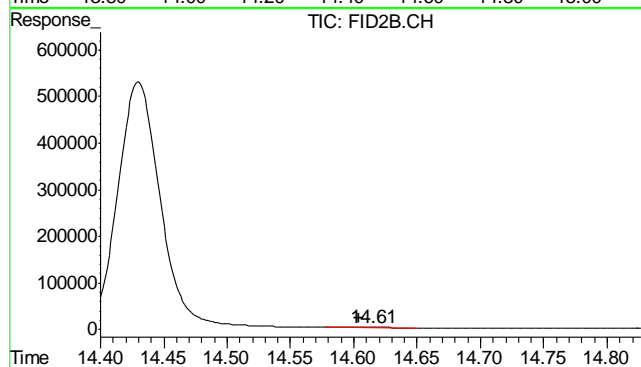
R.T.: 0.000 min  
Exp R.T.: 11.027 min  
Response: 0  
Conc: N.D.

11.21  
11



#10 1,2,4-Trichlorobenzene (P)

R.T.: 14.430 min  
Delta R.T.: 0.007 min  
Response: 12734496  
Conc: 96.44 % m



#11 Naphthalene

R.T.: 14.613 min  
Delta R.T.: 0.009 min  
Response: 30442  
Conc: 0.18 ug/L m

11.2.1  
11

## GC Semi-volatiles

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D49492  
Account: XTOKRWR XTO Energy  
Project: PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP8393-MB	FD27810.D	1	08/19/13	TU	08/16/13	OP8393	GFD1351

The QC reported here applies to the following samples: Method: SW846-8015B

D49492-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	6.7	5.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	66% 35-130%

12.1.1  
12

Blank Spike Summary

Job Number: D49492  
Account: XTOKRWR XTO Energy  
Project: PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP8393-BS	FD27812.D	1	08/19/13	TU	08/16/13	OP8393	GFD1351

The QC reported here applies to the following samples: Method: SW846-8015B

D49492-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	578	87	48-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	87%	35-130%

\* = Outside of Control Limits.



# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D49492  
**Account:** XTOKRWR XTO Energy  
**Project:** PCU 197-34B

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP8393-MS	FD27814.D	20	08/19/13	TU	08/16/13	OP8393	GFD1351
OP8393-MSD	FD27816.D	20	08/19/13	TU	08/16/13	OP8393	GFD1351
D49462-6B	FD27818.D	20	08/19/13	TU	08/16/13	OP8393	GFD1351

The QC reported here applies to the following samples:

Method: SW846-8015B

D49492-1

CAS No.	Compound	D49462-6B mg/kg	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	6330	734	6360	4* a	5420	-124* a	16	20-168/30

CAS No.	Surrogate Recoveries	MS	MSD	D49462-6B	Limits
84-15-1	o-Terphenyl	52%	53%	61%	35-130%

(a) Outside control limits due to high level in sample relative to spike amount.

\* = Outside of Control Limits.

GC Semi-volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\FH081913.SEC\  
 Data File : FH012151.D  
 Signal(s) : FID2B.ch  
 Acq On : 19 Aug 2013 5:00 pm  
 Operator : TIMU  
 Sample : D49492-1  
 Misc : OP8393,GFH665,30.00,,,1,1  
 ALS Vial : 59 Sample Multiplier: 1

Integration File: events.e  
 Quant Time: Aug 20 10:02:43 2013  
 Quant Method : C:\msdchem\1\METHODS\DRO-GFH627R.M  
 Quant Title : DRO-ORO REAR  
 QLast Update : Thu Jul 18 10:36:17 2013  
 Response via : Initial Calibration  
 Integrator: ChemStation

Volume Inj. :  
 Signal Phase :  
 Signal Info :

Compound	R.T.	Response	Conc Units
-----			
System Monitoring Compounds			
1) s o-Terphenyl	12.235	1767689652	1095.566 ug/ml
Target Compounds			
2) H TPH-DRO (C10-C28)	9.878	1812970986	1461.107 ug/ml
-----			

(f)=RT Delta > 1/2 Window

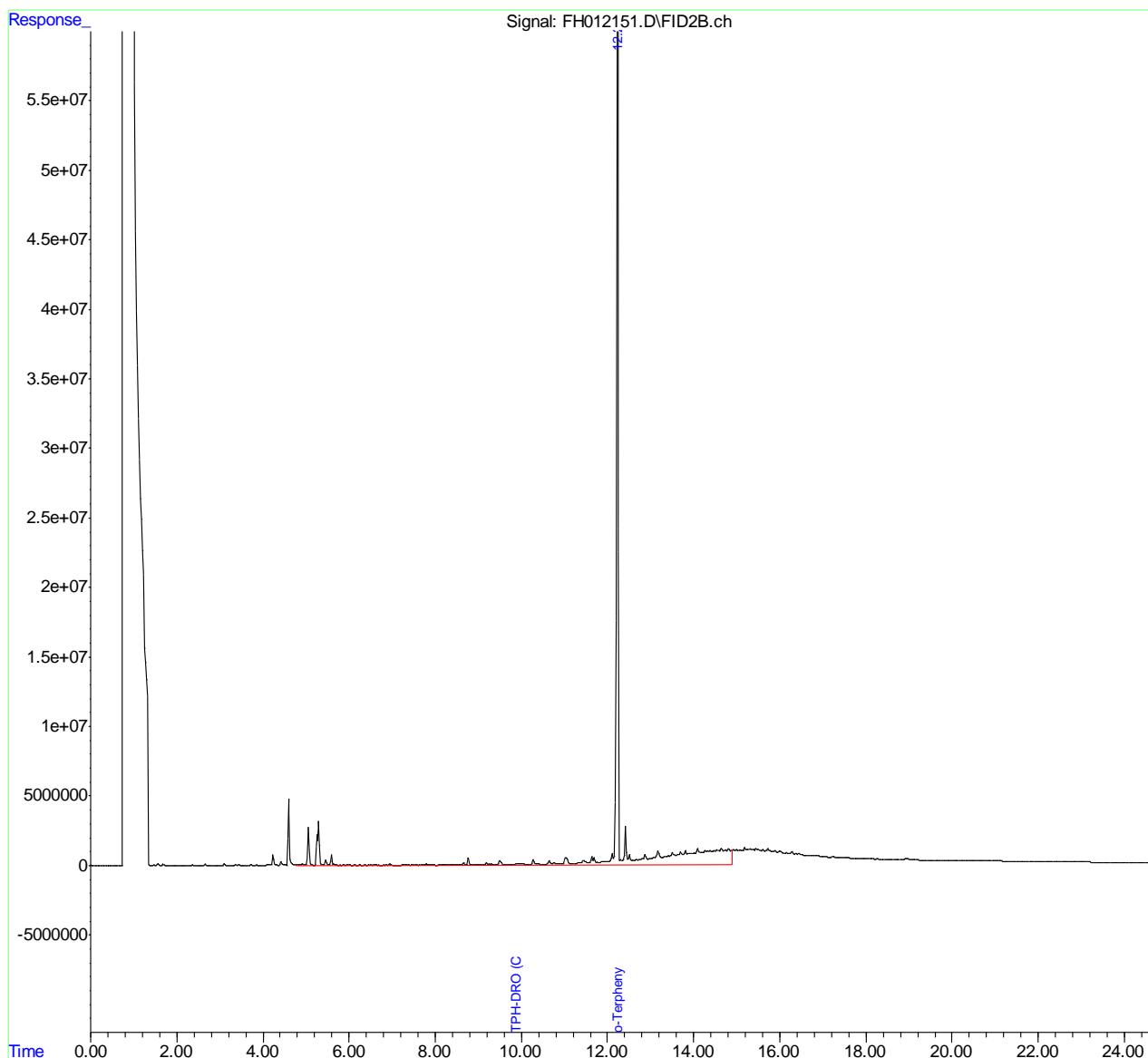
(m)=manual int.

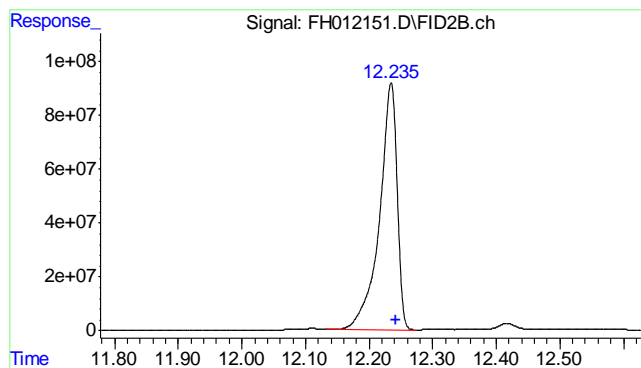
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\FH081913.SEC\  
 Data File : FH012151.D  
 Signal(s) : FID2B.ch  
 Acq On : 19 Aug 2013 5:00 pm  
 Operator : TIMU  
 Sample : D49492-1  
 Misc : OP8393,GFH665,30.00,,,1,1  
 ALS Vial : 59 Sample Multiplier: 1

Integration File: events.e  
 Quant Time: Aug 20 10:02:43 2013  
 Quant Method : C:\msdchem\1\METHODS\DRO-GFH627R.M  
 Quant Title : DRO-ORO REAR  
 QLast Update : Thu Jul 18 10:36:17 2013  
 Response via : Initial Calibration  
 Integrator: ChemStation

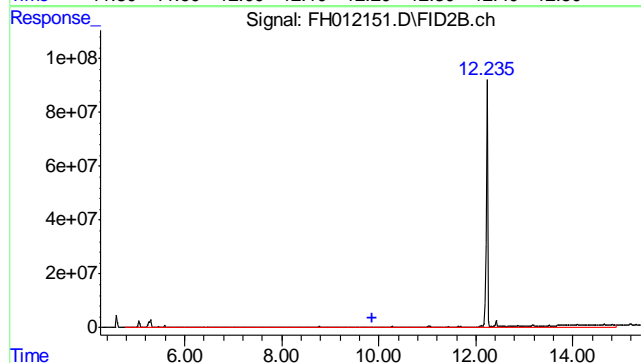
Volume Inj. :  
 Signal Phase :  
 Signal Info :





#1 o-Terphenyl

R.T.: 12.235 min  
 Delta R.T.: -0.008 min  
 Response: 1767689652  
 Conc: 1095.57 ug/ml



#2 TPH-DRO (C10-C28)

R.T.: 9.878 min  
 Delta R.T.: 0.000 min  
 Response: 1812970986  
 Conc: 1461.11 ug/ml m

13.1.1  
 13

## Quantitation Report (QT Reviewed)

Data File : C:\MSDCHEM\2\DATA\2013\AUG\FD081913\FD27810.D Vial: 3  
Acq On : 19 Aug 2013 10:36 am Operator: TIMU  
Sample : OP8393-MB Inst : FID5  
Misc : OP8393,GFD1351,30.00,,,1,1 Multiplr: 1.00  
IntFile : autoint1.e  
Quant Time: Aug 19 11:50:04 2013 Quant Results File: DRO-GFD1345F.RES

Quant Method : C:\MSDCHEM\2...\DRO-GFD1345F.M (Chemstation Integrator)  
Title : 8015B TEH  
Last Update : Wed Aug 14 08:24:56 2013  
Response via : Initial Calibration  
DataAcq Meth : DRODUAL.M

Volume Inj. : 1ul  
Signal Phase : RTX-5  
Signal Info : 530um

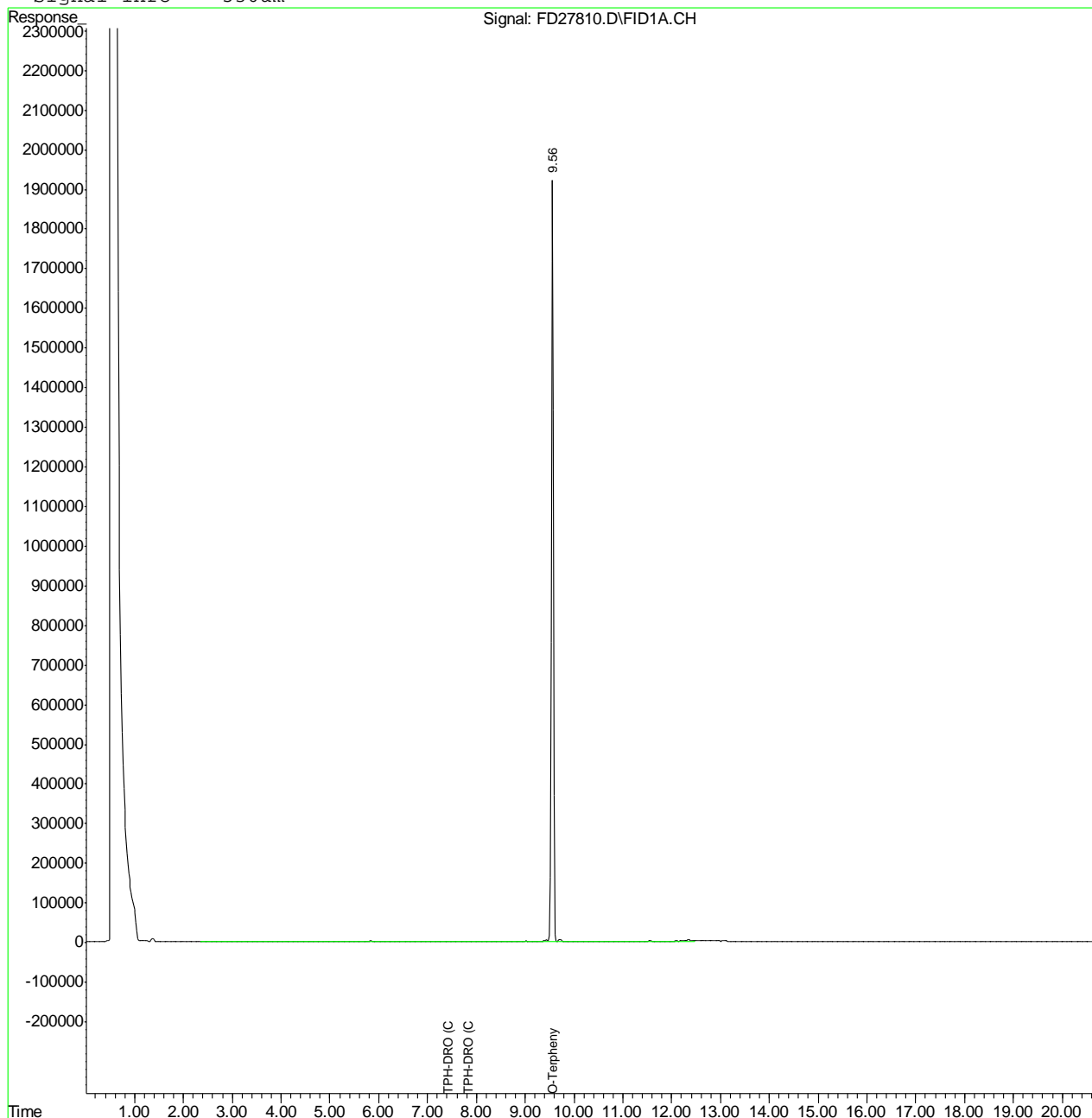
Compound	R.T.	Response	Conc Units
-----			
System Monitoring Compounds			
1) S O-Terphenyl	9.57	62819463	1324.490 mg/L
Target Compounds			
2) H TPH-DRO (C10-C32)	7.85	1987168	54.273 mg/L
3) H TPH-DRO (C10-C28)	7.41	1578246	43.388 mg/L

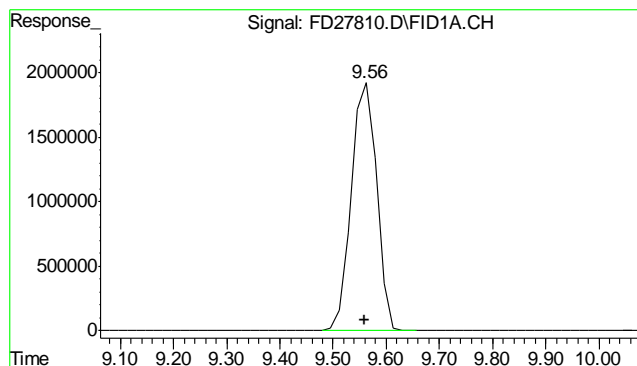
## Quantitation Report (QT Reviewed)

Data File : C:\MSDCHEM\2\DATA\2013\AUG\FD081913\FD27810.D Vial: 3  
Acq On : 19 Aug 2013 10:36 am Operator: TIMU  
Sample : OP8393-MB Inst : FID5  
Misc : OP8393,GFD1351,30.00,,,1,1 Multiplr: 1.00  
IntFile : autoint1.e  
Quant Time: Aug 19 11:50 2013 Quant Results File: DRO-GFD1345F.RES

Quant Method : C:\MSDCHEM\2...\DRO-GFD1345F.M (Chemstation Integrator)  
Title : 8015B TEH  
Last Update : Wed Aug 14 08:24:56 2013  
Response via : Multiple Level Calibration  
DataAcq Meth : DRODUAL.M

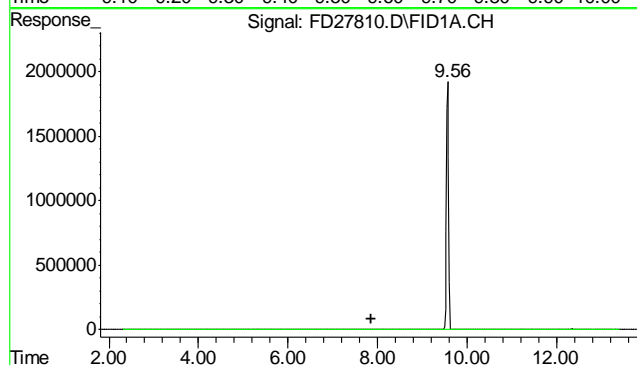
Volume Inj. : 1ul  
Signal Phase : RTX-5  
Signal Info : 530um





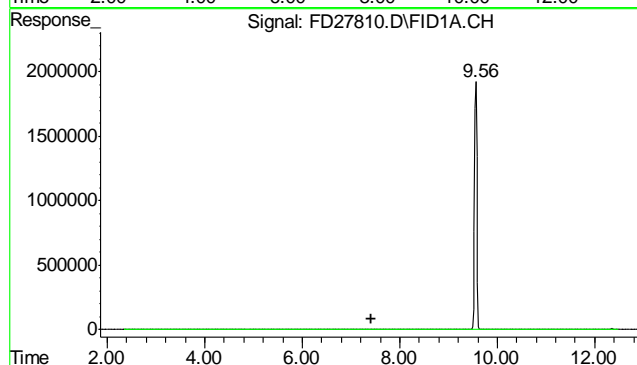
#1 O-Terphenyl

R.T.: 9.565 min  
Delta R.T.: 0.005 min  
Response: 62819463  
Conc: 1324.49 mg/L



#2 TPH-DRO (C10-C32)

R.T.: 7.850 min  
Delta R.T.: 0.000 min  
Response: 1987168  
Conc: 54.27 mg/L m



#3 TPH-DRO (C10-C28)

R.T.: 7.405 min  
Delta R.T.: 0.000 min  
Response: 1578246  
Conc: 43.39 mg/L m



## Metals Analysis

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10858  
Matrix Type: SOLID

Methods: SW846 7471B  
Units: mg/kg

Prep Date: 08/19/13

Metal	RL	IDL	MDL	MB raw	final
-------	----	-----	-----	-----------	-------

Mercury	0.083	.00088	.0067	-0.0018	<0.083
---------	-------	--------	-------	---------	--------

Associated samples MP10858: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
 Account: XTOKRWR - XTO Energy  
 Project: PCU 197-34B

QC Batch ID: MP10858  
 Matrix Type: SOLID

Methods: SW846 7471B  
 Units: mg/kg

Prep Date: 08/19/13

Metal	D49492-1		SpikeLot		QC	
	Original	MS	HGWSR1	% Rec	Limits	
Mercury	0.033	0.41	0.37	101.8	75-125	

Associated samples MP10858: D49492-1

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
 Account: XTOKRWR - XTO Energy  
 Project: PCU 197-34B

QC Batch ID: MP10858  
 Matrix Type: SOLID

Methods: SW846 7471B  
 Units: mg/kg

Prep Date: 08/19/13

Metal	D49492-1 Original MSD		Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
Mercury	0.033	0.39	0.358	99.6	5.0	20

Associated samples MP10858: D49492-1

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D49492  
 Account: XTOKRWR - XTO Energy  
 Project: PCU 197-34B

QC Batch ID: MP10858  
 Matrix Type: SOLID

Methods: SW846 7471B  
 Units: mg/kg

Prep Date: 08/19/13

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
-------	---------------	--------------------	-------	--------------

Mercury	0.34	0.333	102.0	80-120
---------	------	-------	-------	--------

Associated samples MP10858: D49492-1

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date: 08/20/13

Metal	RL	IDL	MDL	MB raw	final
Aluminum	10	1.1	1.8		
Antimony	3.0	.21	.5		
Arsenic	2.5	.38	.63		
Barium	1.0	.02	.36	0.040	<1.0
Beryllium	1.0	.09	.06		
Boron	5.0	.08	.16		
Cadmium	1.0	.02	.28	0.010	<1.0
Calcium	40	.24	6.8		
Chromium	1.0	.03	.03	0.090	<1.0
Cobalt	0.50	.05	.039		
Copper	1.0	.08	.13	0.090	<1.0
Iron	7.0	.15	1.8		
Lead	5.0	.21	.25	-0.010	<5.0
Lithium	0.50	.04	.13		
Magnesium	20	.68	1.8		
Manganese	0.50	.05	.038		
Molybdenum	1.0	.04	.13		
Nickel	3.0	.05	.07	0.060	<3.0
Phosphorus	10	1.5	1.2		
Potassium	200	9.9	12		
Selenium	5.0	.71	1.1	0.020	<5.0
Silicon	5.0	.47	1.1		
Silver	3.0	.03	.05	-0.030	<3.0
Sodium	40	.73	3.7		
Strontium	5.0	.001	.022		
Thallium	1.0	.18	.46		
Tin	5.0	1.2	2.3		
Titanium	1.0	.01	.46		
Uranium	5.0	.29	.31		
Vanadium	1.0	.04	.043		
Zinc	3.0	.04	.16	0.25	<3.0

Associated samples MP10861: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date: 08/20/13

Metal	D49492-1 Original MS		Spikelot ICPAL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic					
Barium	2680	2740	214	28.0 (a)	75-125
Beryllium					
Boron	anr				
Cadmium	0.0	45.2	53.6	84.4	75-125
Calcium					
Chromium	35.3	84.4	53.6	91.7	75-125
Cobalt					
Copper	15.9	64.9	53.6	91.5	75-125
Iron					
Lead	8.9	99.6	107	84.7	75-125
Lithium					
Magnesium					
Manganese					
Molybdenum					
Nickel	21.4	63.1	53.6	77.8	75-125
Phosphorus					
Potassium					
Selenium	0.0	93.0	107	86.8	75-125
Silicon					
Silver	0.17	20.2	21.4	93.5	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc	40.8	86.4	53.6	85.1	75-125

Associated samples MP10861: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested  
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date: 08/20/13

Metal	D49492-1 Original	MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium	2680	3620	221	425.7(a)	27.7 (b)	20
Beryllium						
Boron	anr					
Cadmium	0.0	46.4	55.2	84.1	2.6	20
Calcium						
Chromium	35.3	83.2	55.2	86.8	1.4	20
Cobalt						
Copper	15.9	66.1	55.2	90.9	1.8	20
Iron						
Lead	8.9	101	110	83.4	1.4	20
Lithium						
Magnesium						
Manganese						
Molybdenum						
Nickel	21.4	65.0	55.2	79.0	3.0	20
Phosphorus						
Potassium						
Selenium	0.0	96.3	110	87.2	3.5	20
Silicon						
Silver	0.17	20.6	22.1	92.5	2.0	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	40.8	86.6	55.2	83.0	0.2	20

Associated samples MP10861: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits
- (anr) Analyte not requested
- (a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
- (b) High RPD due to possible sample matrix or nonhomogeneity.

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D49492  
 Account: XTOKRWR - XTO Energy  
 Project: PCU 197-34B

QC Batch ID: MP10861  
 Matrix Type: SOLID

Methods: SW846 6010C  
 Units: mg/kg

Prep Date: 08/20/13

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium	202	200	101.0	80-120
Beryllium				
Boron	anr			
Cadmium	46.0	50	92.0	80-120
Calcium				
Chromium	49.5	50	99.0	80-120
Cobalt				
Copper	47.7	50	95.4	80-120
Iron				
Lead	97.0	100	97.0	80-120
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	47.3	50	94.6	80-120
Phosphorus				
Potassium				
Selenium	96.6	100	96.6	80-120
Silicon				
Silver	20.3	20	101.5	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	49.1	50	98.2	80-120

Associated samples MP10861: D49492-1

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: ug/l

Prep Date: 08/20/13

	D49492-1			QC
Metal	Original	SDL 1:5	%DIF	Limits
Aluminum				
Antimony				
Arsenic				
Barium	23200	24900	7.2	0-10
Beryllium				
Boron	anr			
Cadmium	0.00	0.00	NC	0-10
Calcium				
Chromium	350	348	8.7	0-10
Cobalt				
Copper	136	141	2.3	0-10
Iron				
Lead	83.0	80.0	0.2	0-10
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	221	218	12.7*(a)	0-10
Phosphorus				
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	2.50	3.00	100.0(b)	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	370	435	17.6*(a)	0-10

Associated samples MP10861: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

14.2.4  
14

SERIAL DILUTION RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10861  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

(a) Serial dilution indicates possible matrix interference.

(b) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

14.2.4  
14

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10862  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 08/20/13

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.55	.75		
Antimony	0.20	.0011	.029		
Arsenic	0.10	.0085	.024	0.0084	<0.10
Barium	1.0	.008	.16		
Beryllium	0.10	.008	.049		
Boron	20	.25	.07		
Cadmium	0.050	.018	.038		
Calcium	200	2.8	13		
Chromium	1.0	.027	.11		
Cobalt	0.10	.0025	.0085		
Copper	1.0	.03	.1		
Iron	5.0	1.8	1.8		
Lead	0.25	.004	.0075		
Magnesium	50	.65	.65		
Manganese	0.50	.06	.07		
Molybdenum	0.50	.025	.046		
Nickel	1.0	.0044	.17		
Phosphorus	30	1.3	4.9		
Potassium	100	1.5	2.5		
Selenium	0.20	.03	.13		
Silver	0.050	.00095	.01		
Sodium	250	2.5	5.5		
Strontium	10	.005	.027		
Thallium	0.10	.0012	.0075		
Tin	5.0	.032	2.3		
Titanium	1.0	.03	.085		
Uranium	0.25	.00085	.0015		
Vanadium	2.0	.019	.11		
Zinc	5.0	.11	1.4		

Associated samples MP10862: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10862  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 08/20/13

Metal	D49492-1 Original MS	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	5.9	112	107	99.0 75-125
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP10862: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

14.3.2  
14

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10862  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 08/20/13

Metal	D49492-1 Original	MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	5.9	114	110	97.9	1.8	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP10862: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

14.3.2  
14

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10862  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 08/20/13

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	98.8	100	98.8	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP10862: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

14.3.3  
14

SERIAL DILUTION RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10862  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: ug/l

Prep Date: 08/20/13

Metal	D49492-1 Original SDL 5:25 %DIF			QC Limits
Aluminum				
Antimony				
Arsenic	53.2	49.5	7.0	0-10
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP10862: D49492-1

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

14.3.4  
14

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date: 08/20/13

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	55	210		
Antimony	150	11	95		
Arsenic	130	19	28		
Barium	50	1	7		
Beryllium	50	4.5	6		
Boron	250	4	33		
Cadmium	50	1	1.8		
Calcium	2000	12	210	-7.0	<2000
Chromium	50	1.5	2		
Cobalt	25	2.5	2.9		
Copper	50	4	9.5		
Iron	350	7.5	48		
Lead	250	11	110		
Lithium	25	2	14		
Magnesium	1000	34	95	15.0	<1000
Manganese	25	2.5	2.3		
Molybdenum	50	2	4.2		
Nickel	150	2.5	4.4		
Phosphorus	500	75	100		
Potassium	5000	500	1400		
Selenium	250	36	55		
Silicon	250	24	26		
Silver	150	1.5	3		
Sodium	2000	37	850	-72	<2000
Strontium	25	.05	.6		
Thallium	50	9	20		
Tin	250	60	80		
Titanium	50	.5	11		
Uranium	250	15	28		
Vanadium	50	2	2		
Zinc	150	2	16		

Associated samples MP10866: D49492-1A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date: 08/20/13

Metal	D49462-6A Original MS		Spikelot ICPAL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	27200	162000	125000	107.8	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	5180	133000	125000	102.3	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	80300	213000	125000	106.2	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP10866: D49492-1A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

14.4.2  
14

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date: 08/20/13

Metal	D49462-6A Original	MSD	SpikeLot ICPALL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium	27200	160000	125000	106.2	1.2	20
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium						
Magnesium	5180	130000	125000	99.9	2.3	20
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silicon						
Silver						
Sodium	80300	206000	125000	100.6	3.3	20
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP10866: D49492-1A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

14.4.2  
14

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date: 08/20/13

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	135000	125000	108.0	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	127000	125000	101.6	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	130000	125000	104.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP10866: D49492-1A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

14.4.3  
14

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date: 08/20/13

D49462-6A		QC		
Metal	Original	SDL 1:5	%DIF	Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	5440	5570	2.4	0-10
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	1040	1100	5.9	0-10
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	16100	16900	5.5	0-10
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP10866: D49492-1A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

14.4.4  
14

SERIAL DILUTION RESULTS SUMMARY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

QC Batch ID: MP10866  
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

14.4.4  
14

## General Chemistry

### QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP10718/GN21557	1.0	0.0	mg/kg	92.9	77.7	84.0	80-120%
Specific Conductivity	GP10746/GN21602			umhos/cm	10003	9890	98.9	90-110%
pH	GN21530			su	8.00	8.00	100.0	99.3-100.7%

Associated Samples:  
Batch GN21530: D49492-1  
Batch GP10718: D49492-1  
Batch GP10746: D49492-1  
(\*) Outside of QC limits



DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP10718/GN21557	D49492-1	mg/kg	0.0	0.0	109.0(a)	0-20%
Redox Potential Vs H2	GN21520	D49242-4	mv	203	198	2.5	0-20%

Associated Samples:

Batch GN21520: D49492-1

Batch GP10718: D49492-1

(\*) Outside of QC limits

(a) RPD acceptable due to low duplicate and sample concentrations.

MATRIX SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP10718/GN21557	D49492-1	mg/kg	0.0	40.0	38.5	96.0	75-125%

Associated Samples:

Batch GP10718: D49492-1

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

MATRIX SPIKE DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D49492  
Account: XTOKRWR - XTO Energy  
Project: PCU 197-34B

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Chromium, Hexavalent	GP10718/GN21557	D49492-1	mg/kg	0.0	40.0	37.3	3.2	20%

Associated Samples:  
Batch GP10718: D49492-1  
(\*) Outside of QC limits  
(N) Matrix Spike Rec. outside of QC limits