Mountain States ACCUTEST LABORATORIES

08/24/11

Technical Report for

KRW Consulting, Inc.

XOM PCU 297-12A

1105-16

Accutest Job Number: D26397

Sampling Date: 08/09/11

Report to:

KRW Consulting, Inc.
8000 West 14th Avenue Suite 200
Lakewood, CO 80214
bberger@krwconsulting.com; gknell@krwconsulting.com;
dknudson@krwconsulting.com; jhess@krwconsulting.com;
ATTN: Dwayne Knudson

Total number of pages in report: **131**

ACCREDITED IN ACCORDANCE WITH nelac

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.

John Hamilton
Laboratory Director

Client Service contact: 303-425-6021

Certifications: CO, ID, NE, NM, ND (R-027) (PW) UT (NELAP CO00049)


Test results relate only to samples analyzed.

Sections: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

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# Table of Contents

Accutest Laboratories

# Sample Summary

KRW Consulting, Inc.

**Job No:** D26397

XOM PCU 297-12A
Project No: 1105-16

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Matrix Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| D26397-1 | 08/09/11 | 14:30 | CB | 08/10/11 | SO | Soil | CUTTING PIT #2 SUBLINER |
| D26397-1A | 08/09/11 | 14:30 | CB | 08/10/11 | SO | Soil | CUTTING PIT #2 SUBLINER |

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

# CASE NARRATIVE / CONFORMANCE SUMMARY

| | | | |
|---|---|---|---|
| **Client:** | KRW Consulting, Inc. | **Job No** | D26397 |
| **Site:** | XOM PCU 297-12A | **Report Date** | 8/24/2011 9:43:09 AM |

On 08/10/2011, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 2.2 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D26397 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:** V5V1004

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26396-1MS, D26396-1MSD were used as the QC samples indicated.

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

**Matrix** SO **Batch ID:** OP4232

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- Sample(s) D26355-2MS, D26355-2MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- The matrix spike (MS) and matrix spike duplicate (MSD) recovery(s) of Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Pyrene are outside control limits. Probable cause due to matrix interference and dilution.
- The RPD(s) for the MS and MSD recoveries of Pyrene are outside control limits for sample OP4232-MSD. Probable cause due to sample homogeneity.
- D26397-1: Elevated RL due to matrix interference.

## Volatiles by GC By Method SW846 8015B

**Matrix** SO **Batch ID:** GGB705

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26288-7MS, D26288-7MSD were used as the QC samples indicated.

## Extractables by GC By Method SW846-8015B

**Matrix** SO **Batch ID:** OP4230

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- Sample(s) D26429-4MS, D26429-4MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

## Metals By Method SW846 6010B

| Matrix | AQ | Batch ID: | MP5487 |
|---|---|---|---|

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26396-1AMS, D26396-1AMSD were used as the QC samples for the metals analysis.

| Matrix | SO | Batch ID: | MP5445 |
|---|---|---|---|

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26479-1MS, D26479-1MSD, D26479-1SDL 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 serial dilution RPD(s) for Cadmium, Selenium, Silver, Barium, Chromium, Lead, Nickel, Zinc are outside control limits for sample MP5445-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- MP5445-SD1 for Zinc, Nickel, Lead, Chormium, Barium: Serial dilution indicates possible matrix interference.

## Metals By Method SW846 6020

| Matrix | SO | Batch ID: | MP5446 |
|---|---|---|---|

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26479-1MS, D26479-1MSD, D26479-1SDL were used as the QC samples for the metals analysis.
- The serial dilution RPD(s) for Arsenic are outside control limits for sample MP5446-SD1. Probable cause due to sample homogeneity.
- MP5446-SD1 for Arsenic: Serial dilution indicates possible matrix interference.

## Metals By Method SW846 7471A

| Matrix | SO | Batch ID: | MP5540 |
|---|---|---|---|

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26397-1MS, D26397-1MSD were used as the QC samples for the metals analysis.

## Wet Chemistry By Method ASTM D1498-76M

| Matrix | SO | Batch ID: | GN11018 |
|---|---|---|---|

- Sample(s) D26479-1DUP were used as the QC samples for the Redox Potential Vs H2 analysis.

## Wet Chemistry By Method SM19 2540B M

| Matrix | SO | Batch ID: | GN11027 |
|---|---|---|---|

- The data for SM19 2540B M meets quality control requirements.

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

| Matrix | SO | Batch ID: | R9234 |
|---|---|---|---|

- The data for SW846 3060/7196A M meets quality control requirements.
- D26397-1 for Chromium, Trivalent: Calculated as: (Chromium) - (Chromium, Hexavalent)

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

| Matrix | SO | Batch ID: | M:GP13366 |
|---|---|---|---|

- The data for SW846 3060A/7196A meets quality control requirements.
- D26397-1 for Chromium, Hexavalent: Analysis performed at Accutest Laboratories, Marlborough, MA.

## Wet Chemistry By Method SW846 9045C

| Matrix | SO | Batch ID: | GN11015 |
|---|---|---|---|

- The following samples were run outside of holding time for method SW846 9045C: D26397-1

## Wet Chemistry By Method USDA HANDBOOK 60

| Matrix | SO | Batch ID: | MP5487 |
|---|---|---|---|

- D26397-1A for Sodium Adsorption Ratio: Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+(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.

# SAMPLE DELIVERY GROUP CASE NARRATIVE

| | | | |
|---|---|---|---|
| **Client:** | Accutest Mountain States | **Job No** | D26397 |
| **Site:** | KRWCCOL: XOM PCU 297-12A | **Report Date** | 8/23/2011 11:32:58 AM |

1 Sample(s) were collected on 08/09/2011 and were received at Accutest on 08/10/2011 properly preserved, at 2.2 Deg. C and intact. These Samples received an Accutest job number of D26397. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

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

**Matrix** SO **Batch ID:** GP13366

- All samples were distilled within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26246-1DUP, D26246-1MS were used as the QC samples for Chromium, Hexavalent.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety.The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(D26397).

## Sample Results

Report of Analysis

Accutest Laboratories

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1 | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| **Method:** | SW846 8260B | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 5V16964.D | 1 | 08/11/11 | DC | n/a | n/a | V5V1004 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume | Methanol Aliquot |
|---|---|---|---|
| Run #1 | 5.01 g | 5.0 ml | 100 ul |
| Run #2 | | | |

**Purgeable Aromatics**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 66 | 29 | ug/kg | |
| 108-88-3 | Toluene | ND | 130 | 66 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 130 | 33 | ug/kg | |
| 1330-20-7 | Xylene (total) | ND | 260 | 130 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 2037-26-5 | Toluene-D8 | 114% | | 61-130% |
| 460-00-4 | 4-Bromofluorobenzene | 119% | | 53-131% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 105% | | 62-130% |

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





| | | | |
|---|---|---|---|
| **Client Sample ID:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1 | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| **Method:** | SW846 8270C BY SIM SW846 3546 | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | 3G05452.D | 10 | 08/16/11 | TMB | 08/10/11 | OP4232 | E3G199 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.1 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 | 77 | 62 | ug/kg | |
| 120-12-7 | Anthracene | ND | 77 | 69 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | ND | 190 | 100 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | ND | 190 | 140 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | ND | 190 | 140 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | ND | 190 | 85 | ug/kg | |
| 218-01-9 | Chrysene | ND | 190 | 85 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | ND | 190 | 140 | ug/kg | |
| 206-44-0 | Fluoranthene | ND | 77 | 77 | ug/kg | |
| 86-73-7 | Fluorene | ND | 77 | 65 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 230 | 210 | ug/kg | |
| 91-20-3 | Naphthalene | ND | 77 | 73 | ug/kg | |
| 129-00-0 | Pyrene | ND | 77 | 73 | ug/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 4165-60-0 | Nitrobenzene-d5 | 55% | | 10-145% |
| 321-60-8 | 2-Fluorobiphenyl | 54% | | 10-130% |
| 1718-51-0 | Terphenyl-d14 | 60% | | 22-130% |

(a) Elevated RL due to matrix interference.

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





| | | | |
|---|---|---|---|
| **Client Sample ID:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1 | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| **Method:** | SW846 8015B | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | GB12391.D | 1 | 08/15/11 | SK | n/a | n/a | GGB705 |
| 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 | 13 | 6.6 | mg/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 120-82-1 | 1,2,4-Trichlorobenzene | 81% | | 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





| | | | |
|---|---|---|---|
| **Client Sample ID:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1 | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| **Method:** | SW846-8015B SW846 3546 | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | FD09047.D | 1 | 08/13/11 | CS | 08/11/11 | OP4230 | GFD389 |
| Run #2 | | | | | | | |

| | Initial Weight | Final Volume |
|---|---|---|
| Run #1 | 30.1 g | 2.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | 23.6 | 15 | 10 | mg/kg | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 84-15-1 | o-Terphenyl | 81% | | 61-142% |

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:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1 | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| | | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

**Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 4.4 | 0.45 | mg/kg | 5 | 08/12/11 | 08/12/11 | GJ | SW846 6020 [1] | SW846 3050B [5] |
| Barium | 858 | 1.1 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Cadmium | < 1.1 | 1.1 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Chromium | 47.5 | 1.1 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Copper | 16.4 | 1.1 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Lead | 13.7 | 5.7 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Mercury | < 0.12 | 0.12 | mg/kg | 1 | 08/23/11 | 08/23/11 | JM | SW846 7471A [3] | SW846 7471A [6] |
| Nickel | 23.3 | 3.4 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Selenium | < 5.7 | 5.7 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Silver | < 3.4 | 3.4 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |
| Zinc | 50.3 | 3.4 | mg/kg | 1 | 08/12/11 | 08/13/11 | JM | SW846 6010B [2] | SW846 3050B [4] |

(1) Instrument QC Batch: MA1744
(2) Instrument QC Batch: MA1745
(3) Instrument QC Batch: MA1769
(4) Prep QC Batch: MP5445
(5) Prep QC Batch: MP5446
(6) Prep QC Batch: MP5540

RL = Reporting Limit

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1 | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| | | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

**General Chemistry**

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Chromium, Hexavalent [a] | 0.70 | 0.46 | mg/kg | 1 | 08/18/11 16:00 | AMA | SW846 3060A/7196A |
| Chromium, Trivalent [b] | 46.8 | 1.6 | mg/kg | 1 | 08/18/11 16:00 | AMA | SW846 3060/7196A M |
| Redox Potential Vs H2 | 393 | | mv | 1 | 08/12/11 | JD | ASTM D1498-76M |
| Solids, Percent | 86.4 | | % | 1 | 08/15/11 | SWT | SM19 2540B M |
| Specific Conductivity | 765 | 1.0 | umhos/cm | 1 | 08/18/11 | CJ | DEPT.OF AG, BOOK N9 |
| pH | 9.89 | | su | 1 | 08/12/11 14:35 | JK | SW846 9045C |

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.
(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1A | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| | | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

**SAR Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | 7.72 | 2.0 | mg/l | 1 | 08/17/11 | 08/17/11 | JM | SW846 6010B [1] | EPA 200.7 [2] |
| Magnesium | 1.88 | 1.0 | mg/l | 1 | 08/17/11 | 08/17/11 | JM | SW846 6010B [1] | EPA 200.7 [2] |
| Sodium | 149 | 2.0 | mg/l | 1 | 08/17/11 | 08/17/11 | JM | SW846 6010B [1] | EPA 200.7 [2] |

(1) Instrument QC Batch: MA1757
(2) Prep QC Batch: MP5487

RL = Reporting Limit

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | CUTTING PIT #2 SUBLINER | | |
| **Lab Sample ID:** | D26397-1A | **Date Sampled:** | 08/09/11 |
| **Matrix:** | SO - Soil | **Date Received:** | 08/10/11 |
| | | **Percent Solids:** | 86.4 |
| **Project:** | XOM PCU 297-12A | | |

**General Chemistry**

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Sodium Adsorption Ratio [a] | 12.5 | | ratio | 1 | 08/17/11 18:01 | JM | USDA HANDBOOK 60 |

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

RL = Reporting Limit

Mountain States ACCUTEST LABORATORIES



## Misc. Forms

# Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

ACCUTEST LABORATORIES

# CHAIN OF CUSTODY

PAGE 1 OF 1

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

FED-EX Tracking #:
Bottle Order Control #:
Accutest Quote #:
Accutest Job #: D26397

## Client / Reporting Information

Company Name: KRW Consulting
Street Address: 8000 W. 14th Ave Ste 200
City: Lakewood State: CO Zip: 80214
Project Contact: Dwayne Knudson E-mail:
Phone #: 970 675 4066 Fax #:
Sampler(s) Name(s): Craig Burger Phone #: 970 756 2993

## Project Information

Project Name: XOM PCU 297-12A
Street:
City:
Project#: 1105-16
Client PO#:
Project Manager: Joe Hess

## Billing Information (If different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention: PO#:

## Requested Analysis (see TEST CODE sheet)

Table 910-1

## Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB- Equipment Blank
RB- Rinse Blank
TB-Trip Blank

| Accutest Sample # | Field ID / Point of Collection | MEOH/DI Vial # | Collection Date | Collection Time | Sampled by | Matrix | # of bottles | HCl | NaOH | HNO3 | H2SO4 | NONE | DI Water | MEOH | ENCORE | Bisulfate | Table 910-1 | LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cuttings Pit #2 Subliner | | 8-9-11 | 14:30 | CAB | SO | 5 | | | | | 5 | | | | | X | 01 |

## Data Deliverable Information

Turnaround Time ( Business days) — Approved By (Accutest PM) / Date:

- [x] Std. 10 Business Days
- [ ] Std. 5 Business Days (By Contract only)
- [ ] 5 Day R/ SH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY

Emergency & Rush T/A data available VIA Lablink

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" ( Level 2)
- [ ] Commercial "B" +Narrative
- [ ] FULLT1 ( Level 3+4 )
- [ ] State Forms
- [ ] EDD Format
- [x] PDF

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary

## Comments / Special Instructions

Please email results to KRW
Piceance Cr. XOM Team

**Sample Custody must be documented below each time samples change possession, including courier delivery.**

| | Relinquished by Sampler: | Date Time: | Received By: | Relinquished By: | Date Time: | Received By: |
|---|---|---|---|---|---|---|
| 1 | | 8/9/11 18:05 | 1 | 2 | | 2 8/10/11 1145 |
| 3 | Relinquished By Sampler: | Date Time: | Received By: 3 | Relinquished By: 4 | Date Time: | Received By: 4 |
| 5 | Relinquished by: | Date Time: | Received By: 5 | Custody Seal # | Intact / Not Intact | Preserved where applicable: N/A — On Ice: ☐ — Cooler Temp. 2.2 |

**D26397: Chain of Custody**
**Page 1 of 1**

Mountain States ACCUTEST LABORATORIES



## GC/MS 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:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| V5V1004-MB | 5V16959.D | 1 | 08/11/11 | DC | n/a | n/a | V5V1004 |



**The QC reported here applies to the following samples:** **Method:** SW846 8260B

D26397-1

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 50 | 22 | ug/kg | |
| 100-41-4 | Ethylbenzene | ND | 100 | 25 | 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 | 113% | 61-130% |
| 460-00-4 | 4-Bromofluorobenzene | 104% | 53-131% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 101% | 62-130% |

# Blank Spike Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| V5V1004-BS | 5V16960.D | 1 | 08/11/11 | DC | n/a | n/a | V5V1004 |



**The QC reported here applies to the following samples:** **Method:** SW846 8260B

D26397-1

| CAS No. | Compound | Spike ug/kg | BSP ug/kg | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 50 | 51.3 | 103 | 70-130 |
| 100-41-4 | Ethylbenzene | 50 | 52.0 | 104 | 70-130 |
| 108-88-3 | Toluene | 50 | 50.8 | 102 | 70-130 |
| 1330-20-7 | Xylene (total) | 150 | 156 | 104 | 70-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 2037-26-5 | Toluene-D8 | 108% | 61-130% |
| 460-00-4 | 4-Bromofluorobenzene | 110% | 53-131% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 101% | 62-130% |

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| D26396-1MS | 5V16962.D | 1 | 08/11/11 | DC | n/a | n/a | V5V1004 |
| D26396-1MSD | 5V16963.D | 1 | 08/11/11 | DC | n/a | n/a | V5V1004 |
| D26396-1 | 5V16961.D | 1 | 08/11/11 | DC | n/a | n/a | V5V1004 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

D26397-1

| CAS No. | Compound | D26396-1 ug/kg | Q | Spike ug/kg | MS ug/kg | MS % | MSD ug/kg | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 92.9 | | 3150 | 3380 | 104 | 3210 | 99 | 5 | 70-134/30 |
| 100-41-4 | Ethylbenzene | 384 | | 3150 | 3630 | 103 | 3480 | 98 | 4 | 70-137/30 |
| 108-88-3 | Toluene | 1210 | | 3150 | 4270 | 97 | 4040 | 90 | 6 | 70-130/30 |
| 1330-20-7 | Xylene (total) | 1800 | | 9450 | 11700 | 105 | 11000 | 97 | 6 | 61-131/30 |

| CAS No. | Surrogate Recoveries | MS | MSD | D26396-1 | Limits |
|---|---|---|---|---|---|
| 2037-26-5 | Toluene-D8 | 110% | 99% | 110% | 61-130% |
| 460-00-4 | 4-Bromofluorobenzene | 123% | 112% | 111% | 53-131% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 105% | 93% | 101% | 62-130% |

Mountain States ACCUTEST LABORATORIES

GC/MS Volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081111.S\
Data File : 5V16964.D
Acq On : 11 Aug 2011 2:15 pm
Operator : DONC
Sample : D26397-1, 50x
Misc : MS2556,V5V1004,5.007,,100,5,1
ALS Vial : 9 Sample Multiplier: 1

Quant Time: Aug 12 12:17:37 2011
Quant Method : C:\msdchem\1\METHODS\V5AP998TVH998.M
Quant Title : 8260
QLast Update : Wed Aug 10 06:49:20 2011
Response via : Initial Calibration

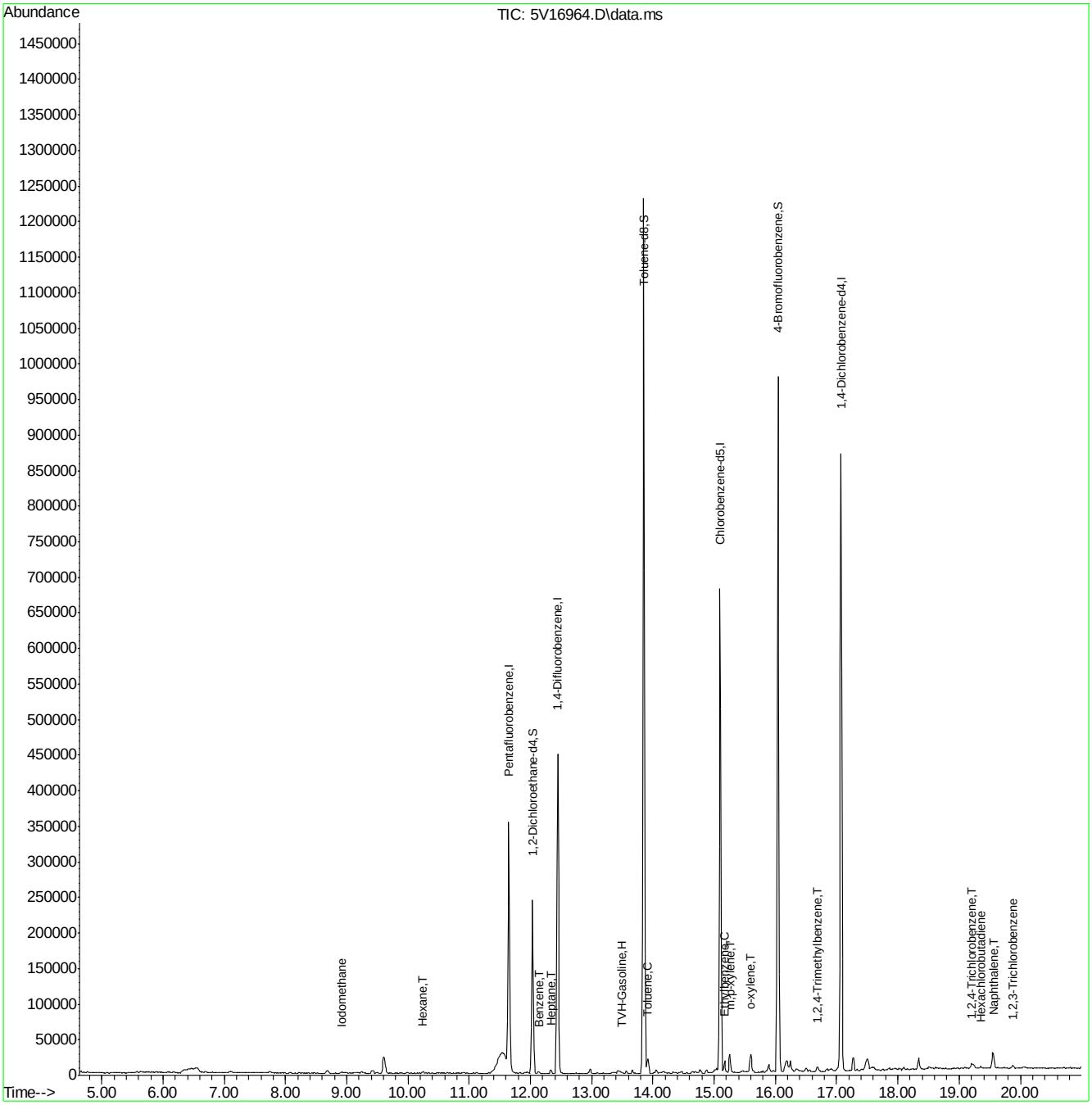
| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 2) Pentafluorobenzene | 11.647 | 168 | 256210 | 50.00 | ug/l | 0.00 |
| 35) 1,4-Difluorobenzene | 12.446 | 114 | 383723 | 50.00 | ug/l | 0.00 |
| 53) Chlorobenzene-d5 | 15.095 | 117 | 433510 | 50.00 | ug/l | 0.00 |
| 74) 1,4-Dichlorobenzene-d4 | 17.070 | 152 | 297730 | 50.00 | ug/l | 0.00 |
| **System Monitoring Compounds** | | | | | | |
| 33) 1,2-Dichloroethane-d4 | 12.035 | 102 | 43243 | 52.47 | ug/l | 0.00 |
| Spiked Amount 50.000 | Range 70 - 130 | | Recovery = 104.94% | | | |
| 61) Toluene-d8 | 13.850 | 98 | 817489 | 57.03 | ug/l | 0.00 |
| Spiked Amount 50.000 | Range 70 - 130 | | Recovery = 114.06% | | | |
| 69) 4-Bromofluorobenzene | 16.043 | 95 | 349536 | 59.43 | ug/l | 0.00 |
| Spiked Amount 50.000 | Range 70 - 130 | | Recovery = 118.86% | | | |
| **Target Compounds** | | | | | | Qvalue |
| 1) TVH-Gasoline | 13.491 | TIC | 350469m | 16.36 | ug/l | |
| 12) Iodomethane | 8.918 | 142 | 5127 | 2.45 | ug/l # | 64 |
| 41) Hexane | 10.243 | 57 | 1379 | 0.27 | ug/l | 100 |
| 43) Heptane | 12.332 | 43 | 1875 | 0.33 | ug/l # | 83 |
| 50) Benzene | 12.138 | 78 | 3216 | 0.22 | ug/l | 100 |
| 62) Toluene | 13.908 | 92 | 6005 | 0.58 | ug/l | 95 |
| 66) Ethylbenzene | 15.175 | 91 | 5519 | 0.29 | ug/l | 96 |
| 72) m,p-xylene | 15.255 | 106 | 8543 | 1.07 | ug/l | 87 |
| 73) o-xylene | 15.597 | 106 | 5834 | 0.75 | ug/l | 91 |
| 82) 1,2,4-Trimethylbenzene | 16.693 | 105 | 4422 | 0.24 | ug/l | 85 |
| 90) 1,2,4-Trichlorobenzene | 19.205 | 180 | 2978 | 0.36 | ug/l | 95 |
| 91) Naphthalene | 19.570 | 128 | 10646 | 1.34 | ug/l | 100 |
| 92) Hexachlorobutadiene | 19.353 | 225 | 1459 | 0.27 | ug/l | 95 |
| 93) 1,2,3-Trichlorobenzene | 19.879 | 180 | 2915 | 0.39 | ug/l # | 93 |

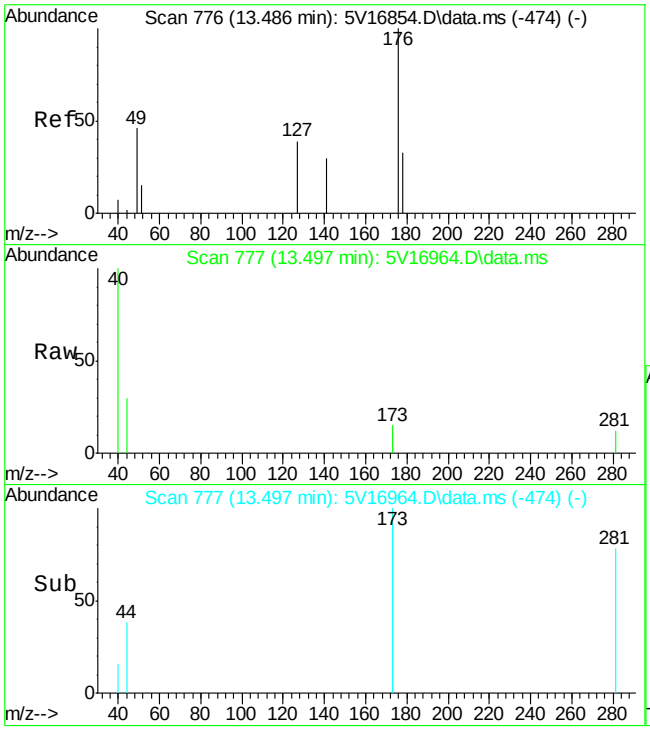
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081111.S\
Data File : 5V16964.D
Acq On : 11 Aug 2011 2:15 pm
Operator : DONC
Sample : D26397-1, 50x
Misc : MS2556,V5V1004,5.007,,100,5,1
ALS Vial : 9 Sample Multiplier: 1

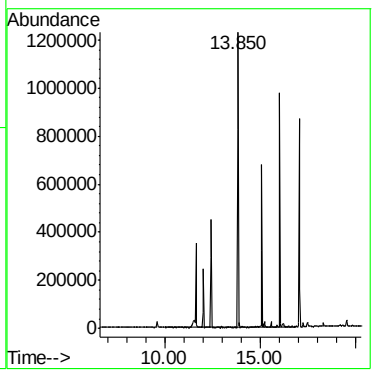
Quant Time: Aug 12 12:17:37 2011
Quant Method : C:\msdchem\1\METHODS\V5AP998TVH998.M
Quant Title : 8260
QLast Update : Wed Aug 10 06:49:20 2011
Response via : Initial Calibration

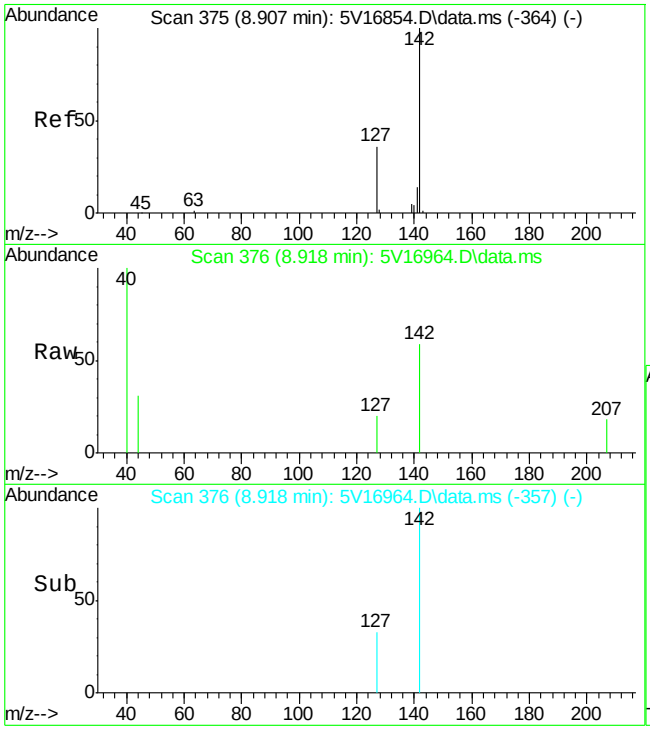





#1
TVH-Gasoline
Concen: 16.36 ug/l m
RT: 13.491 min Scan# 777
Delta R.T. 0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:TIC Resp: 350469

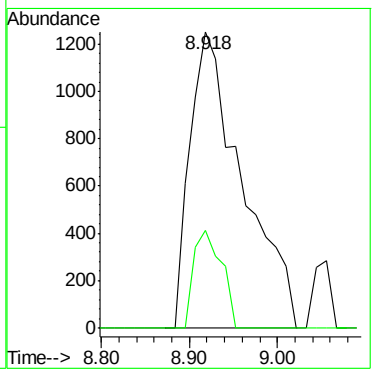


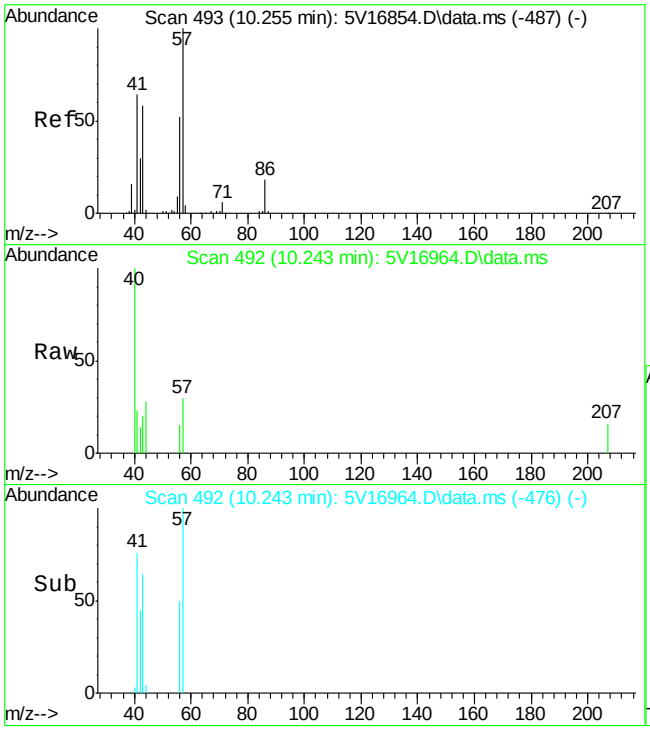




#12
Iodomethane
Concen: 2.45 ug/l
RT: 8.918 min Scan# 376
Delta R.T. 0.011 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:142 Resp: 5127

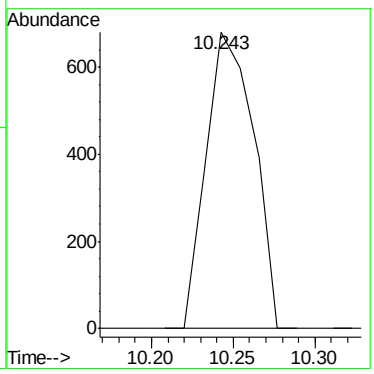
| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 142 | 100 | | |
| 127 | 17.6 | 32.0 | 48.0# |

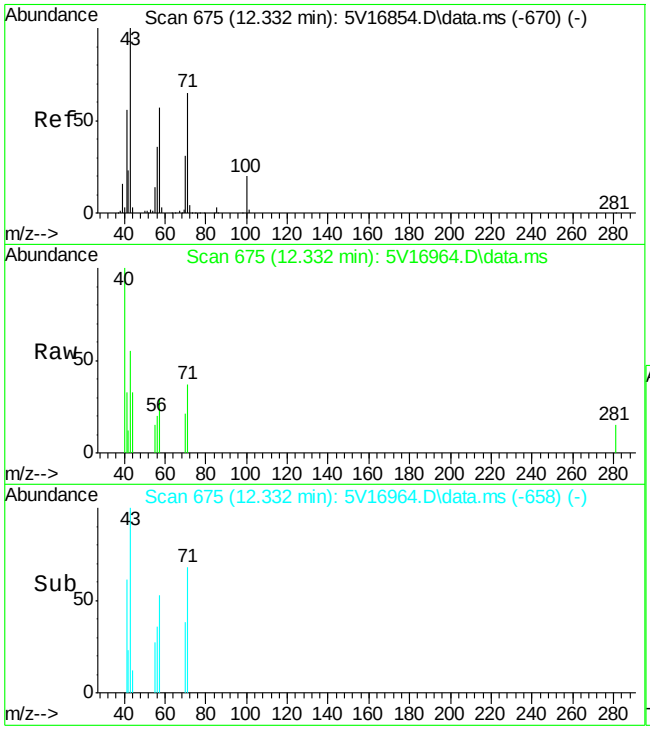





#41
Hexane
Concen: 0.27 ug/l
RT: 10.243 min Scan# 492
Delta R.T. -0.012 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion: 57 Resp: 1379

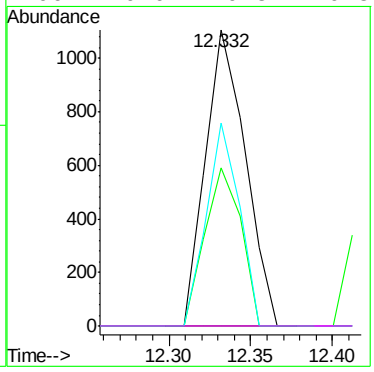


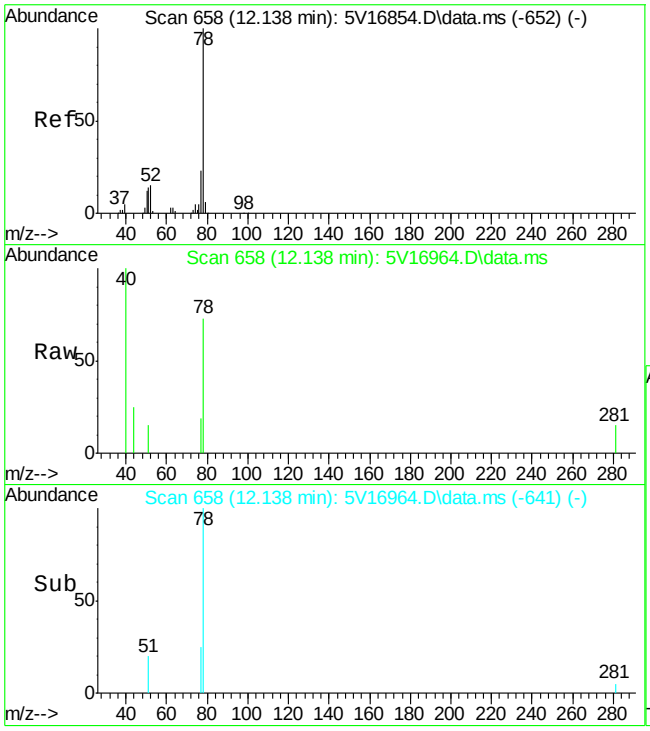




#43
Heptane
Concen: 0.33 ug/l
RT: 12.332 min Scan# 675
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion: 43 Resp: 1875

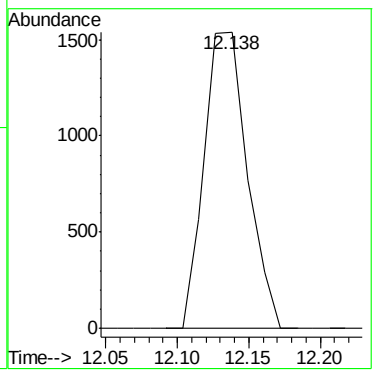
| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 43 | 100 | | |
| 57 | 48.2 | 37.4 | 77.4 |
| 71 | 56.4 | 46.4 | 86.4 |
| 100 | 0.0 | 0.8 | 40.8# |

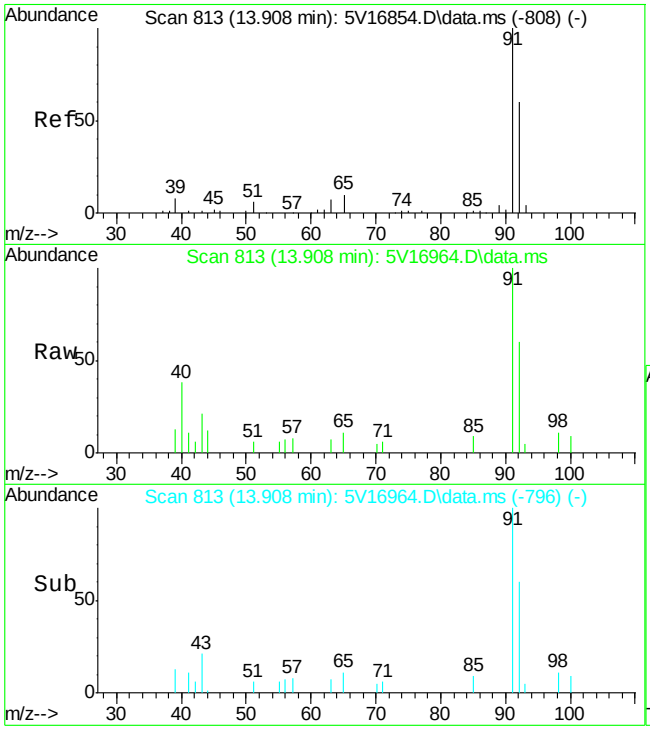





#50
Benzene
Concen: 0.22 ug/l
RT: 12.138 min Scan# 658
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion: 78 Resp: 3216

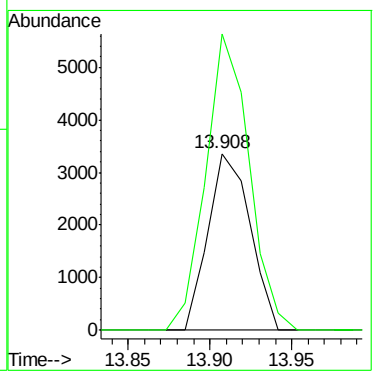


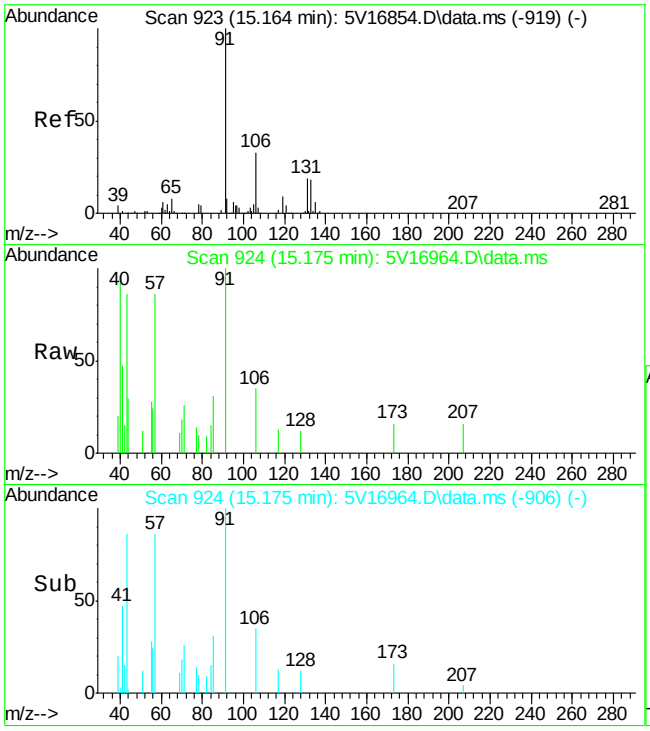




#62
Toluene
Concen: 0.58 ug/l
RT: 13.908 min Scan# 813
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion: 92 Resp: 6005

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 92 | 100 | | |
| 91 | 173.2 | 146.1 | 186.1 |

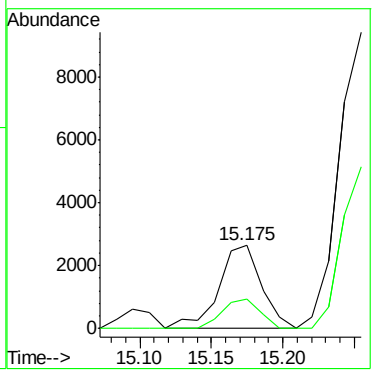


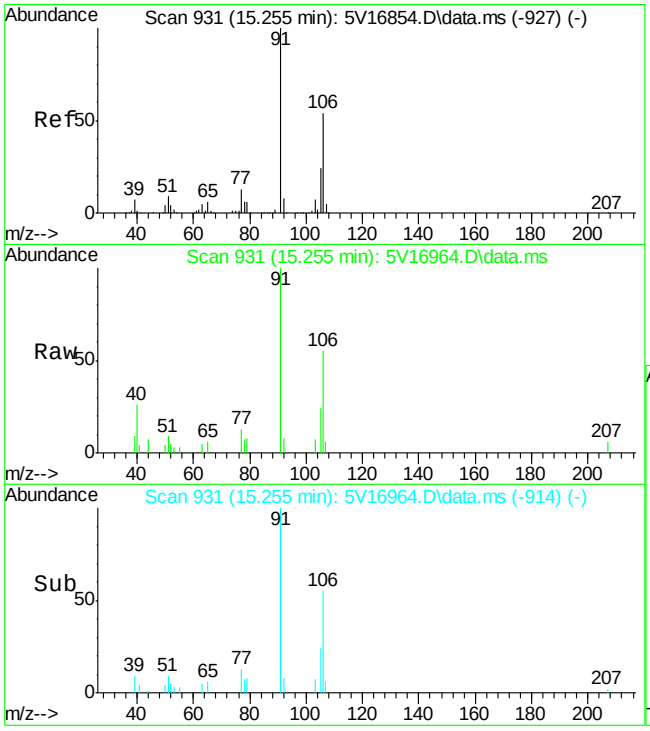



#66
Ethylbenzene
Concen: 0.29 ug/l
RT: 15.175 min Scan# 924
Delta R.T. 0.011 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion: 91 Resp: 5519

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 91 | 100 | | |
| 106 | 30.9 | 13.0 | 53.0 |

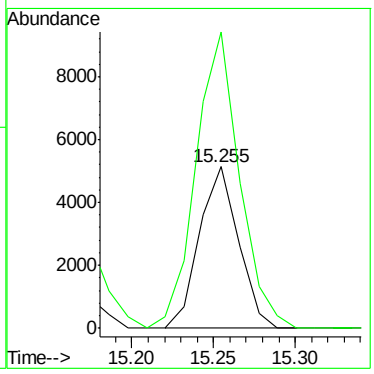


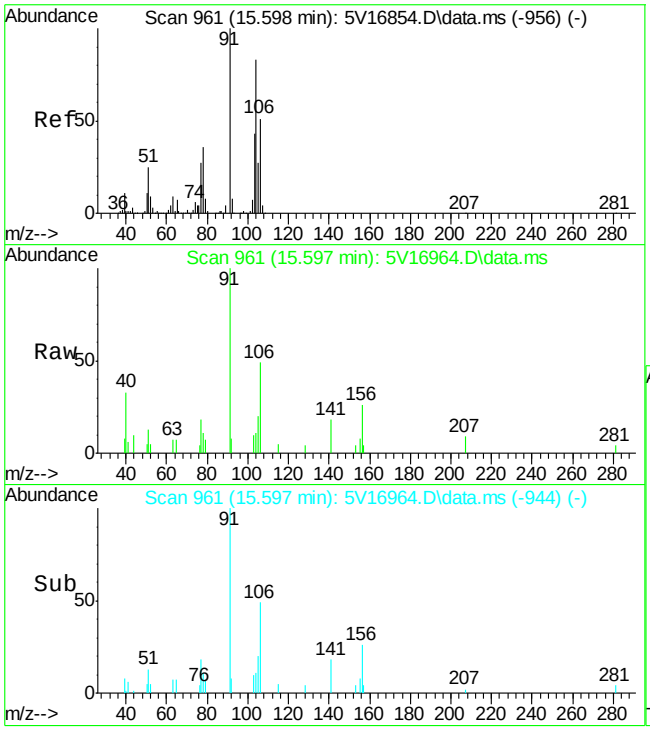




#72
m,p-xylene
Concen: 1.07 ug/l
RT: 15.255 min Scan# 931
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:106 Resp: 8543

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 106 | 100 | | |
| 91 | 204.4 | 165.9 | 205.9 |

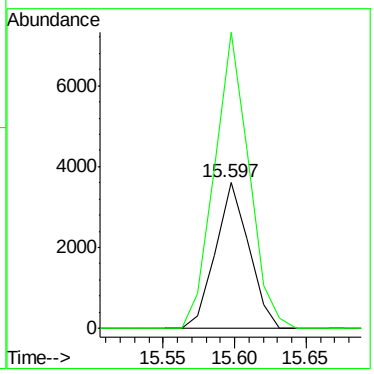


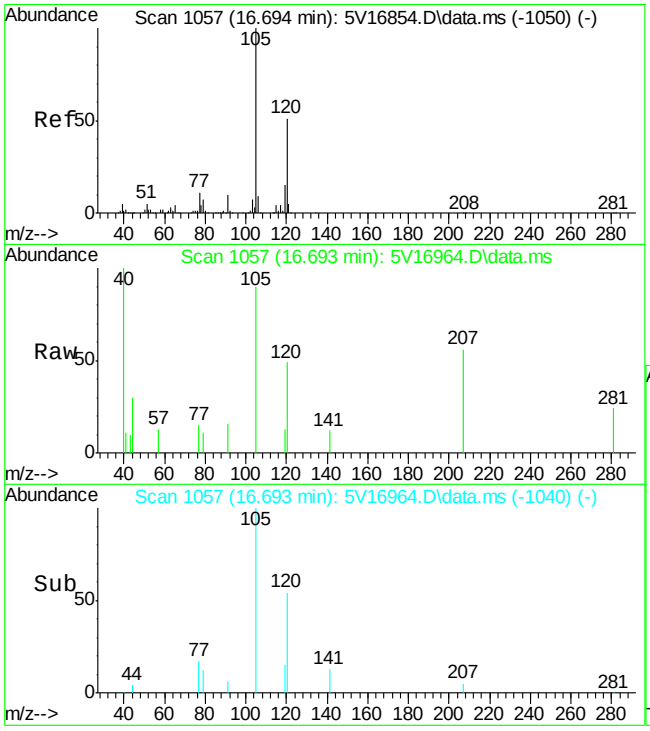



#73
o-xylene
Concen: 0.75 ug/l
RT: 15.597 min Scan# 961
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:106 Resp: 5834

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 106 | 100 | | |
| 91 | 210.1 | 157.4 | 236.2 |

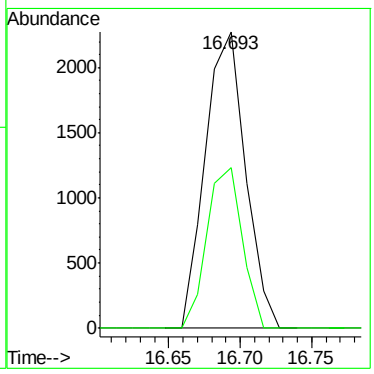


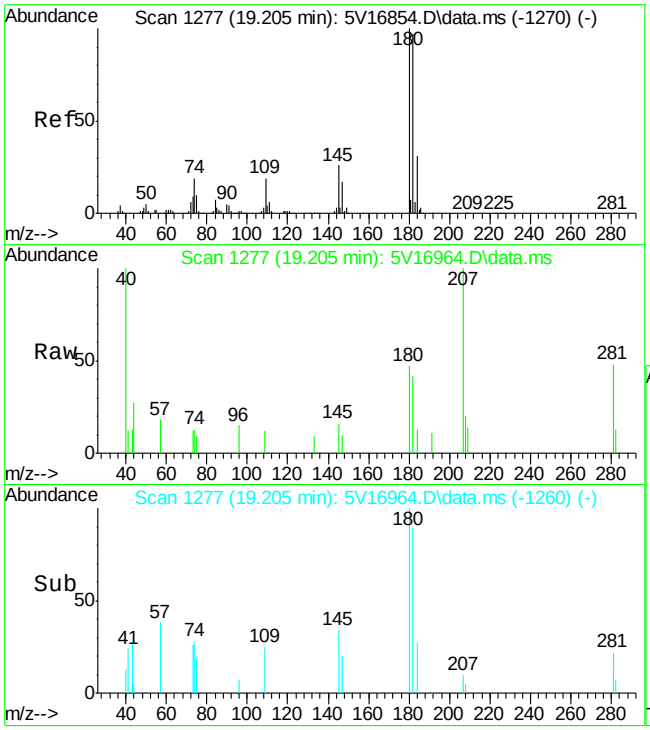




#82
1,2,4-Trimethylbenzene
Concen: 0.24 ug/l
RT: 16.693 min Scan# 1057
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:105 Resp: 4422

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 105 | 100 | | |
| 120 | 47.5 | 46.8 | 70.2 |

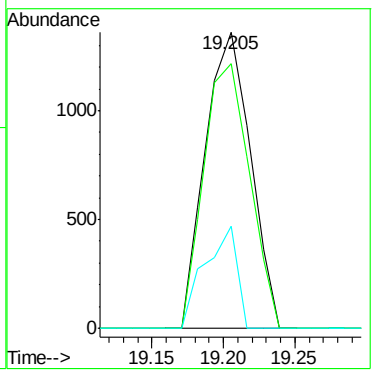


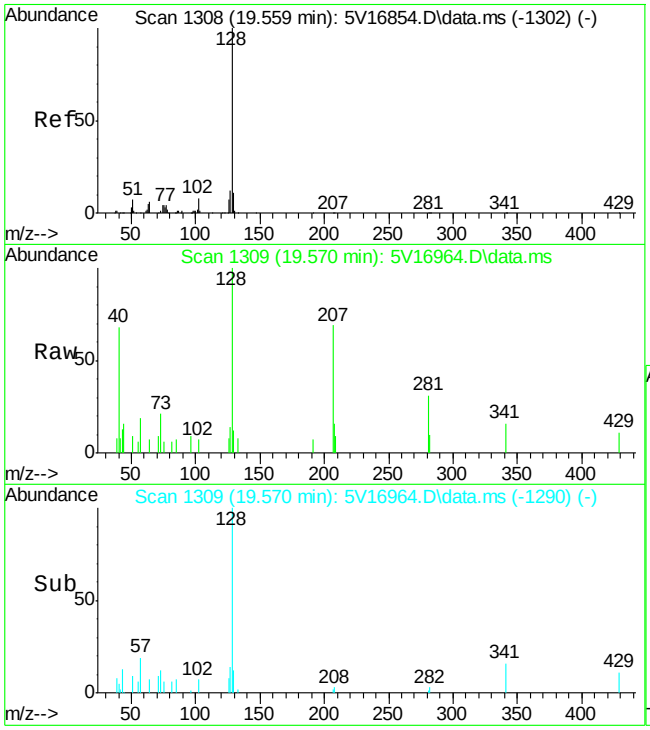



#90
1,2,4-Trichlorobenzene
Concen: 0.36 ug/l
RT: 19.205 min Scan# 1277
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:180 Resp: 2978

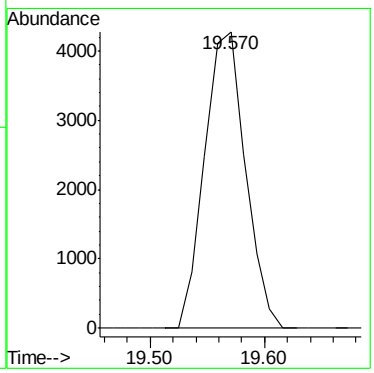
| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 180 | 100 | | |
| 182 | 90.7 | 76.7 | 115.1 |
| 145 | 24.5 | 20.7 | 31.1 |

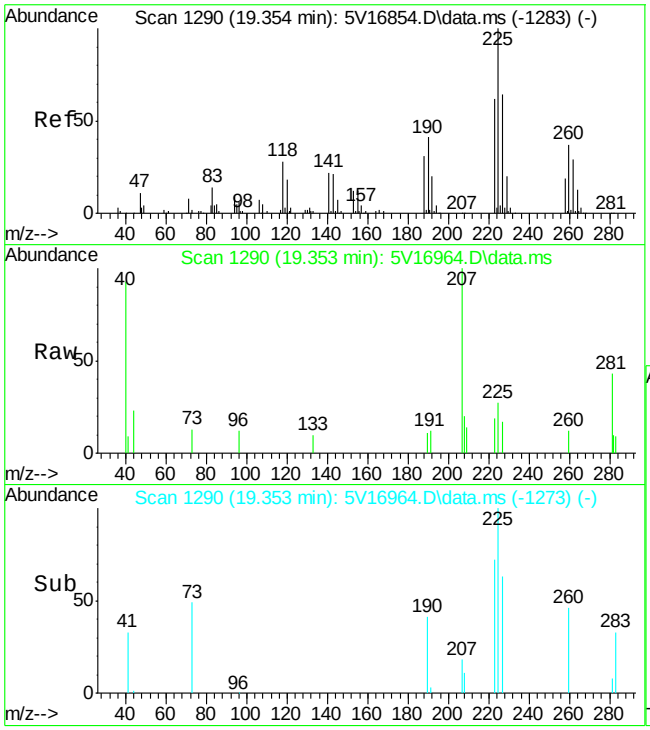



#91
Naphthalene
Concen: 1.34 ug/l
RT: 19.570 min Scan# 1309
Delta R.T. 0.011 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:128 Resp: 10646

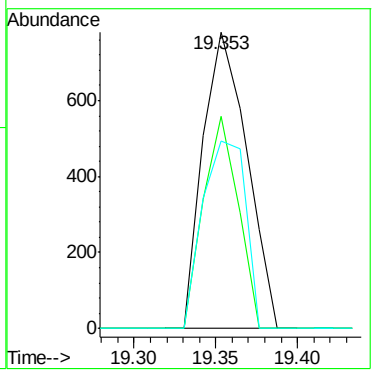


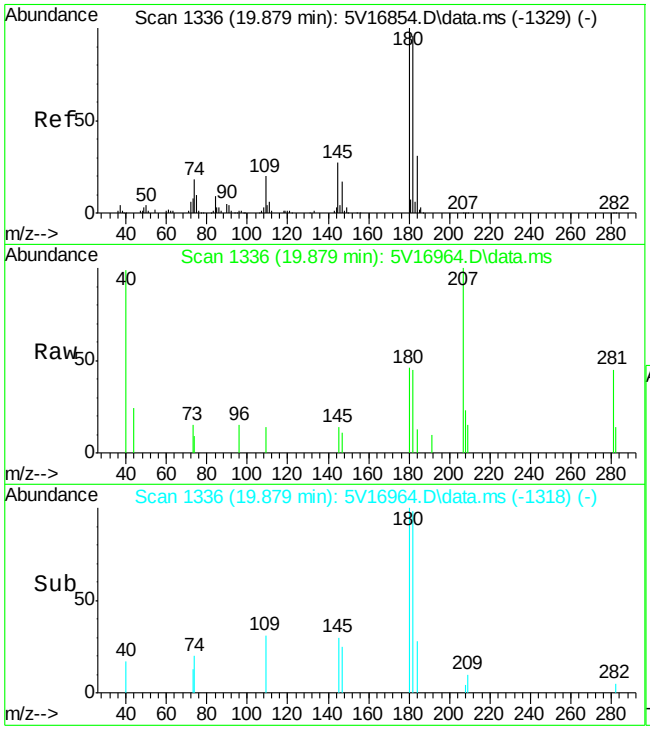



#92
Hexachlorobutadiene
Concen: 0.27 ug/l
RT: 19.353 min Scan# 1290
Delta R.T. -0.000 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:225 Resp: 1459

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 225 | 100 | | |
| 223 | 56.5 | 49.5 | 74.3 |
| 227 | 61.5 | 51.3 | 76.9 |

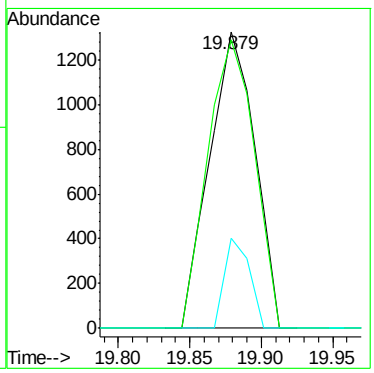



#93
1,2,3-Trichlorobenzene
Concen: 0.39 ug/l
RT: 19.879 min Scan# 1336
Delta R.T. 0.001 min
Lab File: 5V16964.D
Acq: 11 Aug 2011 2:15 pm

Tgt Ion:180 Resp: 2915

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 180 | 100 | | |
| 182 | 100.6 | 77.6 | 116.4 |
| 145 | 16.8 | 22.2 | 33.4# |



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081111.S\
Data File : 5V16959.D
Acq On : 11 Aug 2011 11:37 am
Operator : DONC
Sample : MB
Misc : MS2556,V5V1004,5,,100,5,1
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Aug 12 12:11:59 2011
Quant Method : C:\msdchem\1\METHODS\V5AP998TVH998.M
Quant Title : 8260
QLast Update : Wed Aug 10 06:49:20 2011
Response via : Initial Calibration

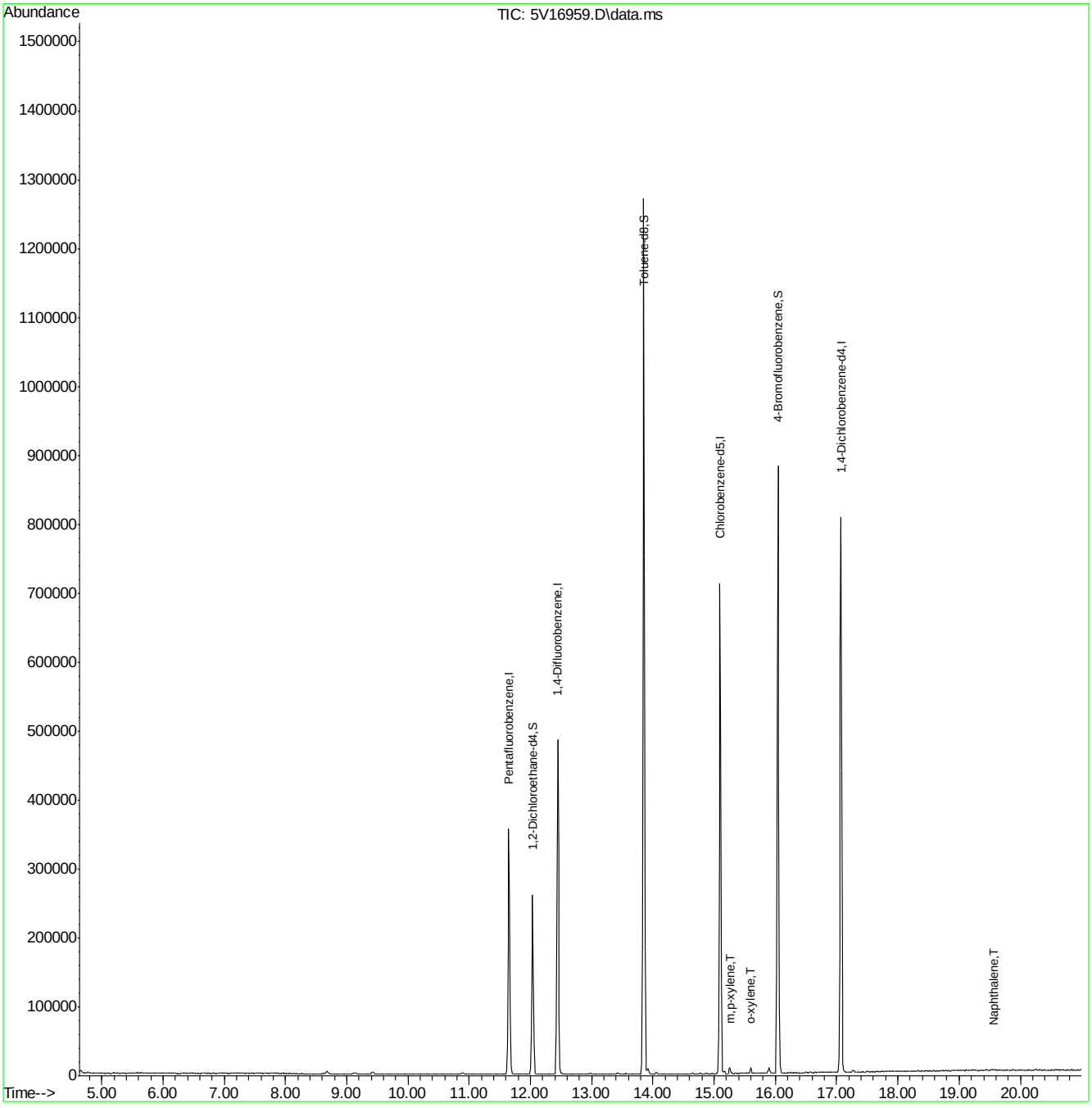
| Internal Standards | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| 2) Pentafluorobenzene | 11.647 | 168 | 273302 | 50.00 | ug/l | 0.00 |
| 35) 1,4-Difluorobenzene | 12.446 | 114 | 415165 | 50.00 | ug/l | 0.00 |
| 53) Chlorobenzene-d5 | 15.095 | 117 | 451529 | 50.00 | ug/l | 0.00 |
| 74) 1,4-Dichlorobenzene-d4 | 17.070 | 152 | 278880 | 50.00 | ug/l | 0.00 |
| **System Monitoring Compounds** | | | | | | |
| 33) 1,2-Dichloroethane-d4 | 12.035 | 102 | 44264 | 50.35 | ug/l | 0.00 |
| Spiked Amount 50.000 | Range 70 - 130 | | Recovery = 100.70% | | | |
| 61) Toluene-d8 | 13.850 | 98 | 845576 | 56.64 | ug/l | 0.00 |
| Spiked Amount 50.000 | Range 70 - 130 | | Recovery = 113.28% | | | |
| 69) 4-Bromofluorobenzene | 16.043 | 95 | 317653 | 51.85 | ug/l | 0.00 |
| Spiked Amount 50.000 | Range 70 - 130 | | Recovery = 103.70% | | | |
| **Target Compounds** | | | | | | Qvalue |
| 72) m,p-xylene | 15.255 | 106 | 3304 | 0.40 | ug/l | 98 |
| 73) o-xylene | 15.597 | 106 | 2395 | 0.30 | ug/l | 90 |
| 91) Naphthalene | 19.559 | 128 | 884 | 0.70 | ug/l | 100 |

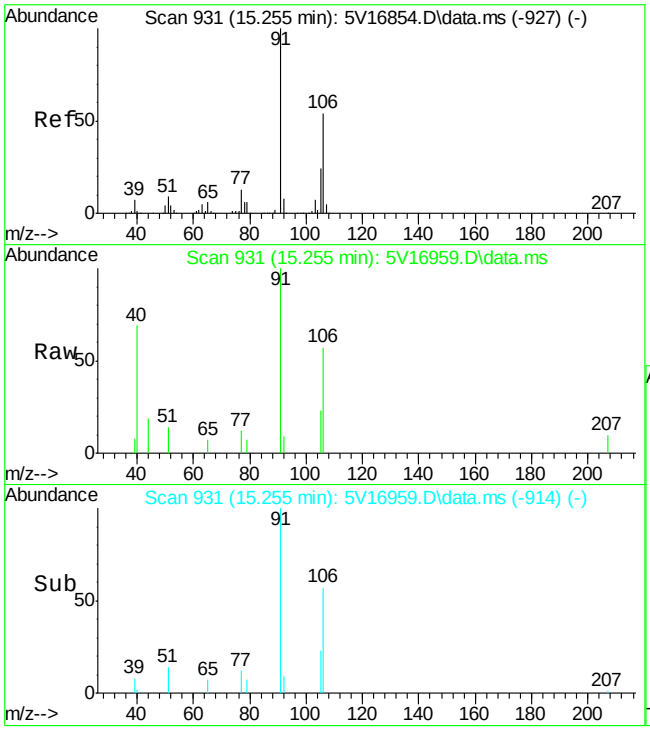
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\V5081111.S\
Data File : 5V16959.D
Acq On : 11 Aug 2011 11:37 am
Operator : DONC
Sample : MB
Misc : MS2556,V5V1004,5,,100,5,1
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Aug 12 12:11:59 2011
Quant Method : C:\msdchem\1\METHODS\V5AP998TVH998.M
Quant Title : 8260
QLast Update : Wed Aug 10 06:49:20 2011
Response via : Initial Calibration

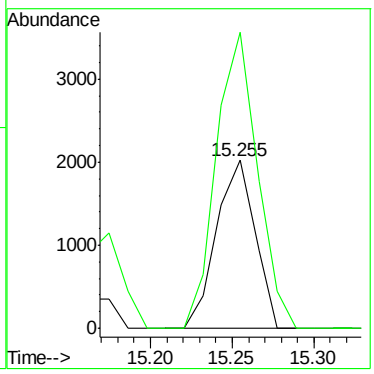


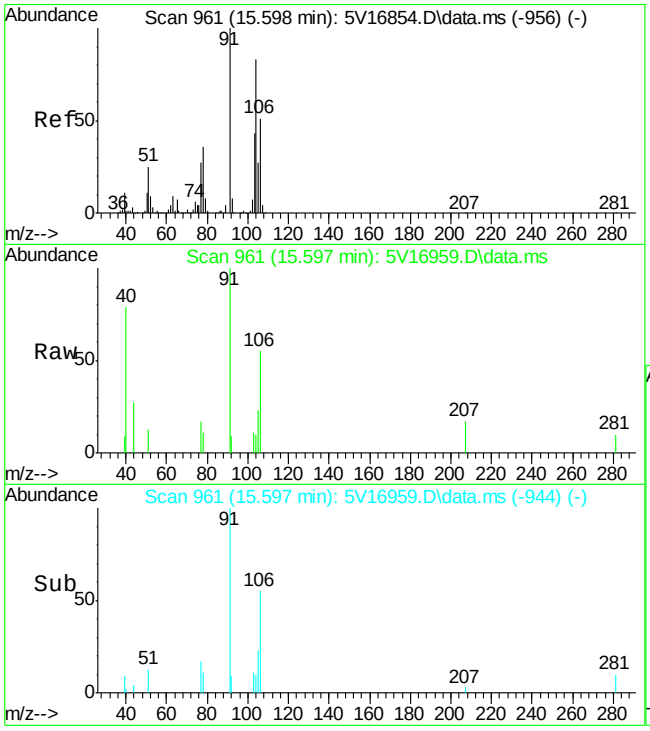



#72
m,p-xylene
Concen: 0.40 ug/l
RT: 15.255 min Scan# 931
Delta R.T. -0.000 min
Lab File: 5V16959.D
Acq: 11 Aug 2011 11:37 am

Tgt Ion:106 Resp: 3304

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 106 | 100 | | |
| 91 | 189.0 | 165.9 | 205.9 |

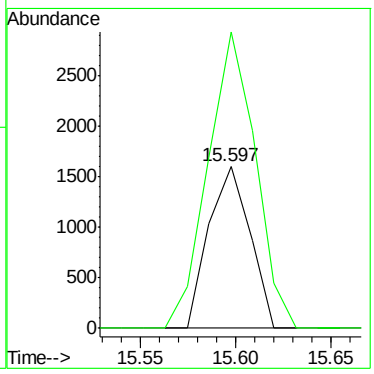


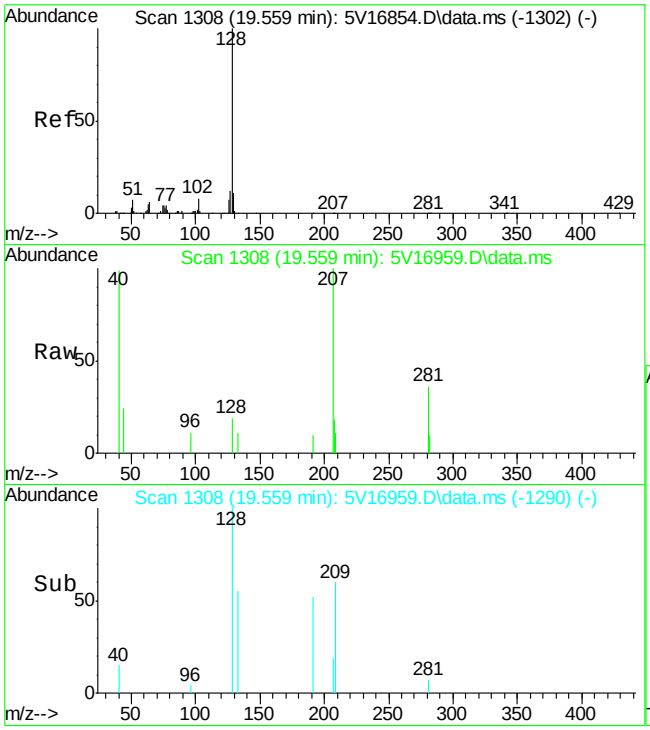




#73
o-xylene
Concen: 0.30 ug/l
RT: 15.597 min Scan# 961
Delta R.T. -0.000 min
Lab File: 5V16959.D
Acq: 11 Aug 2011 11:37 am

Tgt Ion:106 Resp: 2395

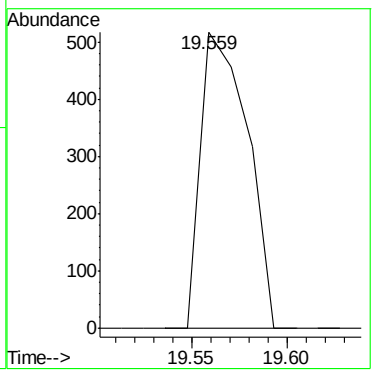
| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 106 | 100 | | |
| 91 | 212.2 | 157.4 | 236.2 |






#91
Naphthalene
Concen: 0.70 ug/l
RT: 19.559 min Scan# 1308
Delta R.T. -0.000 min
Lab File: 5V16959.D
Acq: 11 Aug 2011 11:37 am

Tgt Ion:128 Resp: 884



Mountain States ACCUTEST LABORATORIES



## GC/MS 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:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP4232-MB | 3G05443.D | 1 | 08/15/11 | TMB | 08/10/11 | OP4232 | E3G199 |

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

D26397-1

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 83-32-9 | Acenaphthene | ND | 6.7 | 5.3 | ug/kg | |
| 120-12-7 | Anthracene | ND | 6.7 | 6.0 | ug/kg | |
| 56-55-3 | Benzo(a)anthracene | ND | 17 | 8.7 | ug/kg | |
| 50-32-8 | Benzo(a)pyrene | ND | 17 | 12 | ug/kg | |
| 205-99-2 | Benzo(b)fluoranthene | ND | 17 | 12 | ug/kg | |
| 207-08-9 | Benzo(k)fluoranthene | ND | 17 | 7.3 | ug/kg | |
| 218-01-9 | Chrysene | ND | 17 | 7.3 | ug/kg | |
| 53-70-3 | Dibenzo(a,h)anthracene | ND | 17 | 12 | ug/kg | |
| 206-44-0 | Fluoranthene | ND | 6.7 | 6.7 | ug/kg | |
| 86-73-7 | Fluorene | ND | 6.7 | 5.7 | ug/kg | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | 20 | 18 | ug/kg | |
| 91-20-3 | Naphthalene | ND | 6.7 | 6.3 | ug/kg | |
| 129-00-0 | Pyrene | ND | 6.7 | 6.3 | ug/kg | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 4165-60-0 | Nitrobenzene-d5 | 88% | 10-145% |
| 321-60-8 | 2-Fluorobiphenyl | 89% | 10-130% |
| 1718-51-0 | Terphenyl-d14 | 92% | 22-130% |

# Blank Spike Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP4232-BS | 3G05444.D | 1 | 08/15/11 | TMB | 08/10/11 | OP4232 | E3G199 |

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

D26397-1

| CAS No. | Compound | Spike ug/kg | BSP ug/kg | BSP % | Limits |
|---|---|---|---|---|---|
| 83-32-9 | Acenaphthene | 83.3 | 62.4 | 75 | 34-130 |
| 120-12-7 | Anthracene | 83.3 | 61.8 | 74 | 35-130 |
| 56-55-3 | Benzo(a)anthracene | 83.3 | 62.4 | 75 | 36-130 |
| 50-32-8 | Benzo(a)pyrene | 83.3 | 62.0 | 74 | 36-130 |
| 205-99-2 | Benzo(b)fluoranthene | 83.3 | 67.6 | 81 | 35-130 |
| 207-08-9 | Benzo(k)fluoranthene | 83.3 | 62.3 | 75 | 37-130 |
| 218-01-9 | Chrysene | 83.3 | 67.2 | 81 | 40-130 |
| 53-70-3 | Dibenzo(a,h)anthracene | 83.3 | 56.0 | 67 | 32-130 |
| 206-44-0 | Fluoranthene | 83.3 | 60.5 | 73 | 38-130 |
| 86-73-7 | Fluorene | 83.3 | 59.4 | 71 | 35-130 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 83.3 | 56.7 | 68 | 28-130 |
| 91-20-3 | Naphthalene | 83.3 | 64.4 | 77 | 35-130 |
| 129-00-0 | Pyrene | 83.3 | 60.8 | 73 | 37-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 4165-60-0 | Nitrobenzene-d5 | 83% | 10-145% |
| 321-60-8 | 2-Fluorobiphenyl | 84% | 10-130% |
| 1718-51-0 | Terphenyl-d14 | 85% | 22-130% |

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP4232-MS [a] | 3G05448.D | 25 | 08/15/11 | TMB | 08/10/11 | OP4232 | E3G199 |
| OP4232-MSD [a] | 3G05449.D | 25 | 08/15/11 | TMB | 08/10/11 | OP4232 | E3G199 |
| D26355-2 | 3G05447.D | 25 | 08/15/11 | TMB | 08/10/11 | OP4232 | E3G199 |

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

D26397-1

| CAS No. | Compound | D26355-2 ug/kg | Q | Spike ug/kg | MS ug/kg | MS % | MSD ug/kg | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 83-32-9 | Acenaphthene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-155/30 |
| 120-12-7 | Anthracene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-155/30 |
| 56-55-3 | Benzo(a)anthracene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-175/30 |
| 50-32-8 | Benzo(a)pyrene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-164/30 |
| 205-99-2 | Benzo(b)fluoranthene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-165/30 |
| 207-08-9 | Benzo(k)fluoranthene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-178/30 |
| 218-01-9 | Chrysene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-147/30 |
| 53-70-3 | Dibenzo(a,h)anthracene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-144/30 |
| 206-44-0 | Fluoranthene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-207/30 |
| 86-73-7 | Fluorene | 284 | | 103 | 382 | 95 | 354 | 68 | 8 | 10-163/30 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | ND | | 103 | ND | 0* | ND | 0* | nc | 10-180/30 |
| 91-20-3 | Naphthalene | 360 | | 103 | 540 | 175 | 470 | 107 | 14 | 10-198/30 |
| 129-00-0 | Pyrene | ND | | 103 | 228 | 222* | ND | 0* | 200* | 10-189/30 |

| CAS No. | Surrogate Recoveries | MS | MSD | D26355-2 | Limits |
|---|---|---|---|---|---|
| 4165-60-0 | Nitrobenzene-d5 | 45% | 41% | 44% | 10-145% |
| 321-60-8 | 2-Fluorobiphenyl | 53% | 44% | 39% | 10-130% |
| 1718-51-0 | Terphenyl-d14 | 75% | 67% | 66% | 22-130% |

(a) Outside control limits due to dilution.

Mountain States ACCUTEST LABORATORIES

GC/MS Semi-volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081511\
Data File : 3g05452.D
Acq On : 16 Aug 2011 12:05 am
Operator : TamiB
Sample : D26397-1,10x
Misc : OP4232,E3G199,30.08,,,1,10
ALS Vial : 14 Sample Multiplier: 1

Quant Time: Aug 16 09:25:17 2011
Quant Method : C:\msdchem\1\METHODS\SIMPE3G198.M
Quant Title : PAHSIM BASE
QLast Update : Tue Aug 09 09:37:56 2011
Response via : Initial Calibration

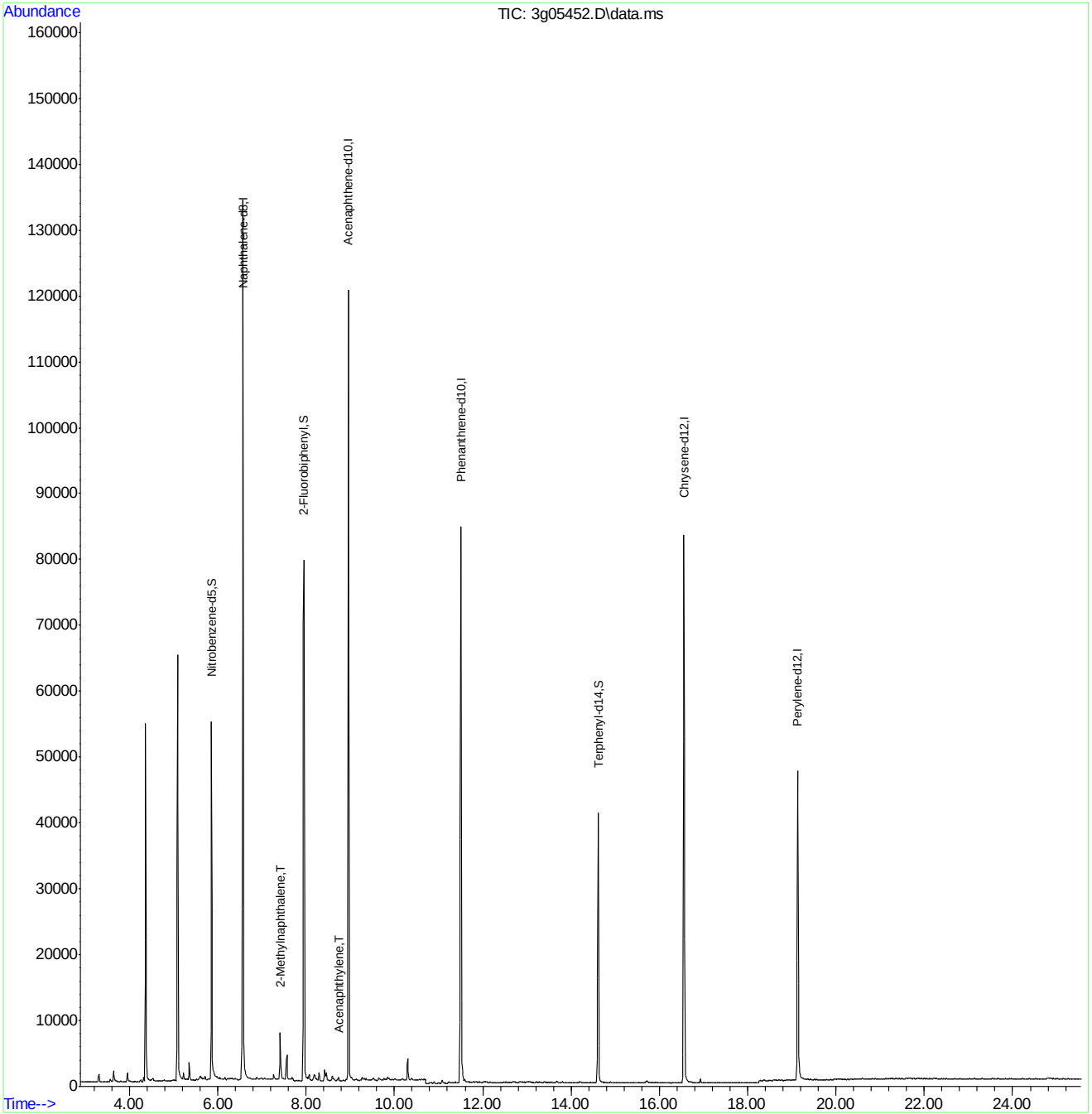
| Compound | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|---|---|---|---|---|---|---|
| Internal Standards | | | | | | |
| 1) Naphthalene-d8 | 6.568 | 136 | 135440 | 4.00 | ug/mL | 0.00 |
| 6) Acenaphthene-d10 | 8.956 | 164 | 70156 | 4.00 | ug/mL | -0.01 |
| 14) Phenanthrene-d10 | 11.506 | 188 | 100702 | 4.00 | ug/mL | 0.00 |
| 18) Chrysene-d12 | 16.558 | 240 | 88428 | 4.00 | ug/mL | 0.00 |
| 23) Perylene-d12 | 19.130 | 264 | 62182 | 4.00 | ug/mL | -0.01 |
| System Monitoring Compounds | | | | | | |
| 2) Nitrobenzene-d5 | 5.857 | 82 | 29217 | 2.76 | ug/mL | 0.00 |
| 7) 2-Fluorobiphenyl | 7.951 | 172 | 81824 | 2.72 | ug/mL | 0.00 |
| 20) Terphenyl-d14 | 14.617 | 244 | 46183 | 3.00 | ug/mL | 0.00 |
| Target Compounds | | | | | | Qvalue |
| 3) N-Nitrosodimethylamine | 0.000 | | 0 | N.D. | d | |
| 4) N-Nitrosodi-propylamine | 0.000 | | 0 | N.D. | d | |
| 5) Naphthalene | 0.000 | | 0 | N.D. | d | |
| 8) 2-Methylnaphthalene | 7.416 | 142 | 4482 | 0.11 | ug/mL | 99 |
| 9) 1-Methylnaphthalene | 0.000 | | 0 | N.D. | d | |
| 10) Acenaphthylene | 8.731 | 152 | 66 | 0.00 | ug/mL# | 1 |
| 11) Acenaphthene | 0.000 | | 0 | N.D. | d | |
| 12) Fluorene | 0.000 | | 0 | N.D. | d | |
| 13) Diphenylamine | 0.000 | | 0 | N.D. | d | |
| 15) Phenanthrene | 0.000 | | 0 | N.D. | d | |
| 16) Anthracene | 0.000 | | 0 | N.D. | d | |
| 17) Fluoranthene | 0.000 | | 0 | N.D. | d | |
| 19) Pyrene | 0.000 | | 0 | N.D. | d | |
| 21) Benzo(a)anthracene | 0.000 | | 0 | N.D. | d | |
| 22) Chrysene | 0.000 | | 0 | N.D. | d | |
| 24) Benzo(b)fluoranthene | 0.000 | | 0 | N.D. | d | |
| 25) Benzo(k)fluoranthene | 0.000 | | 0 | N.D. | d | |
| 26) Benzo(a)pyrene | 0.000 | | 0 | N.D. | d | |
| 27) Indeno(1,2,3-cd)pyrene | 0.000 | | 0 | N.D. | d | |
| 28) Dibenz(a,h)anthracene | 0.000 | | 0 | N.D. | d | |
| 29) Benzo(g,h,i)perylene | 0.000 | | 0 | N.D. | d | |

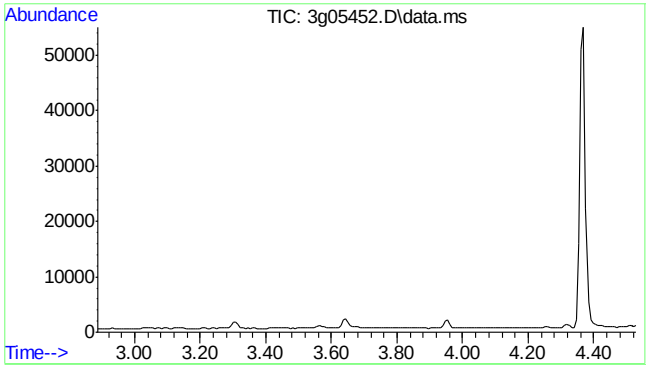
(#) = qualifier out of range (m) = manual integration (+) = signals summed

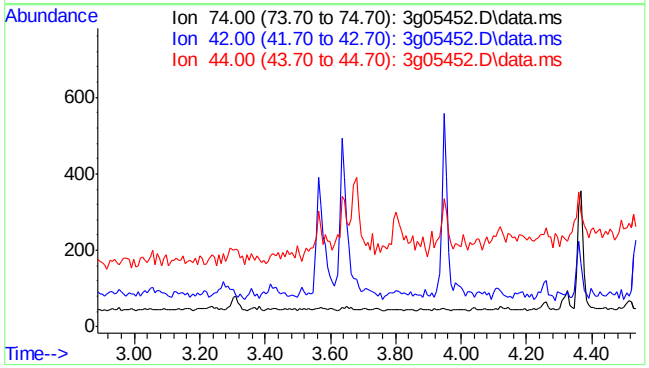
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081511\
Data File : 3g05452.D
Acq On : 16 Aug 2011 12:05 am
Operator : TamiB
Sample : D26397-1,10x
Misc : OP4232,E3G199,30.08,,,1,10
ALS Vial : 14 Sample Multiplier: 1

Quant Time: Aug 16 09:25:17 2011
Quant Method : C:\msdchem\1\METHODS\SIMPE3G198.M
Quant Title : PAHSIM BASE
QLast Update : Tue Aug 09 09:37:56 2011
Response via : Initial Calibration





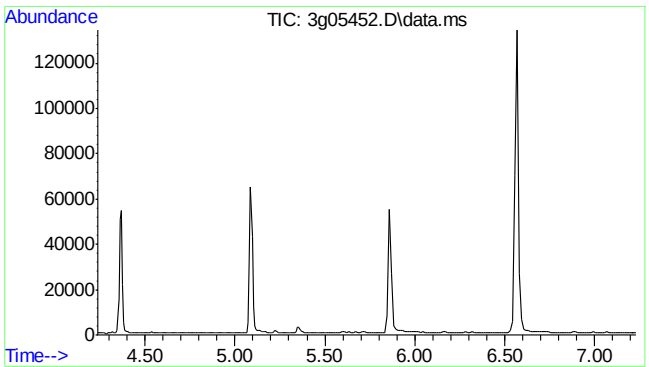



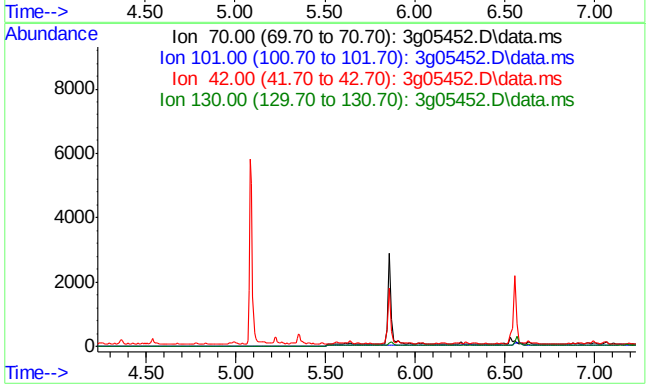

#3
N-Nitrosodimethylamine
Concen: N.D. ug/mL
Expected RT: 3.03 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 74

| Sig | Exp Ratio |
|---|---|
| 74 | 100 |
| 42 | 59.7 |
| 44 | 5.1 |



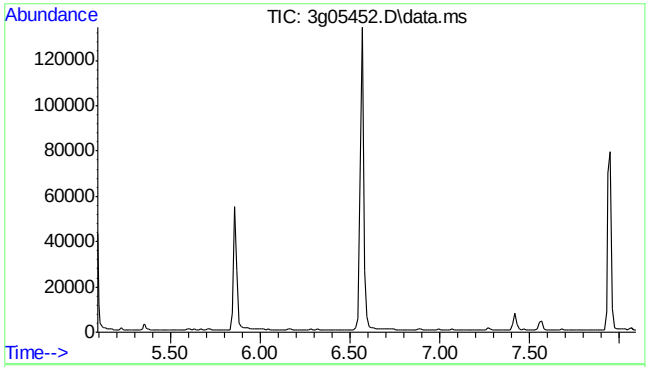




#4
N-Nitrosodi-propylamine
Concen: N.D. ug/mL
Expected RT: 5.73 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 70

| Sig | Exp Ratio |
|---|---|
| 70 | 100 |
| 101 | 14.4 |
| 42 | 63.2 |
| 130 | 37.8 |

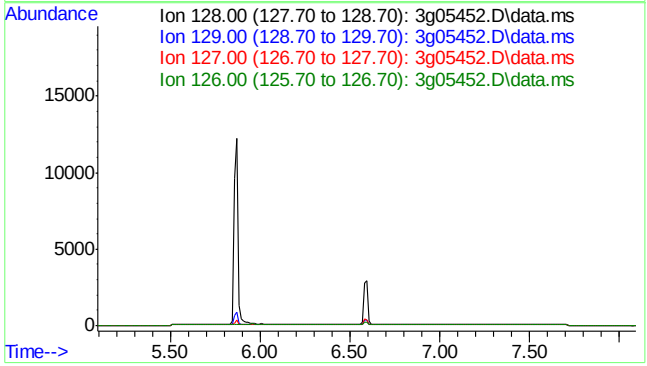


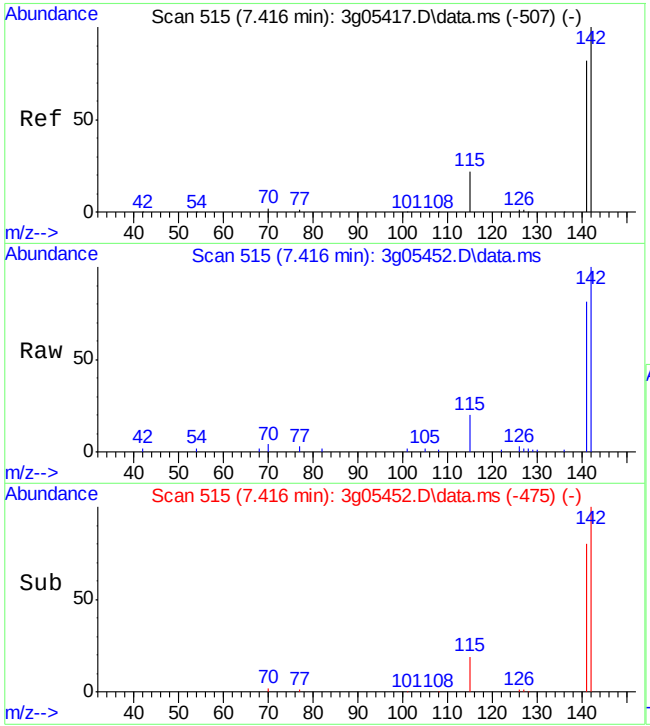

#5
Naphthalene
Concen: N.D. ug/mL
Expected RT: 6.59 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 128

| Sig | Exp Ratio |
|---|---|
| 128 | 100 |
| 129 | 10.8 |
| 127 | 11.6 |
| 126 | 6.4 |

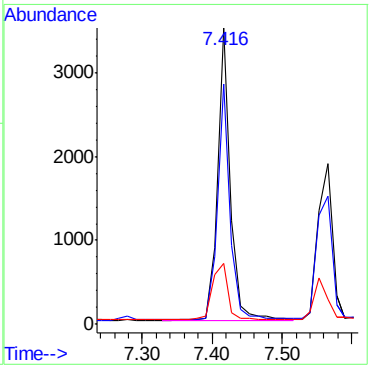


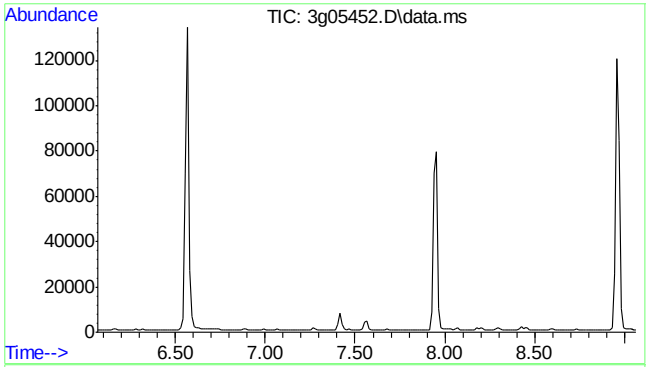




#8
2-Methylnaphthalene
Concen: 0.11 ug/mL
RT: 7.416 min Scan# 515
Delta R.T. -0.000 min
Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion:142 Resp: 4482

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 142 | 100 | | |
| 141 | 80.0 | 60.1 | 100.1 |
| 115 | 24.4 | 2.7 | 42.7 |



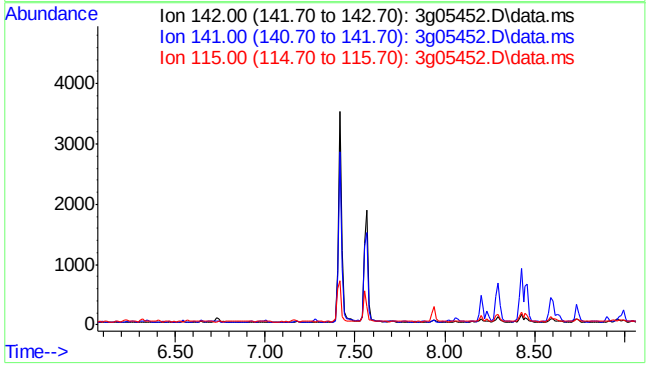


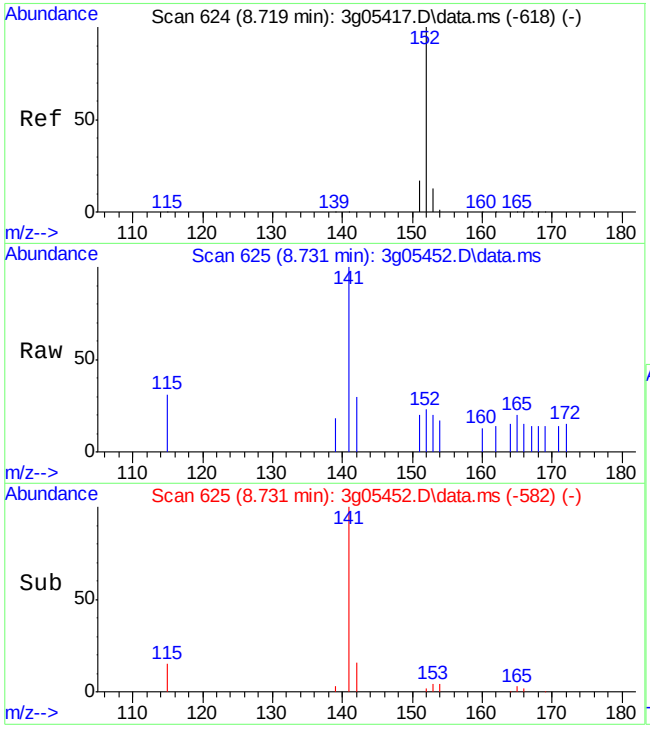

#9
1-Methylnaphthalene
Concen: N.D. ug/mL
Expected RT: 7.57 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 142

| Sig | Exp Ratio |
|---|---|
| 142 | 100 |
| 141 | 83.6 |
| 115 | 23.7 |

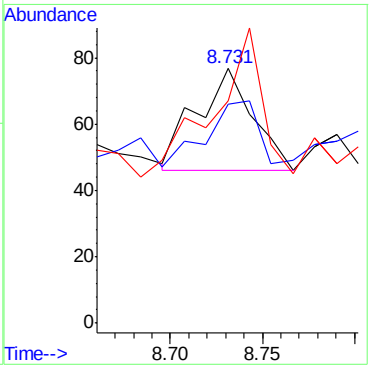


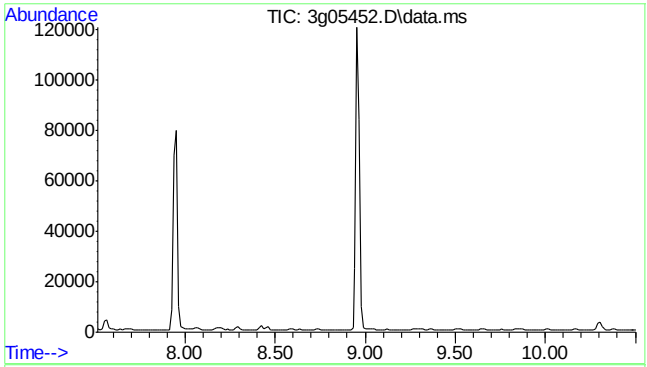



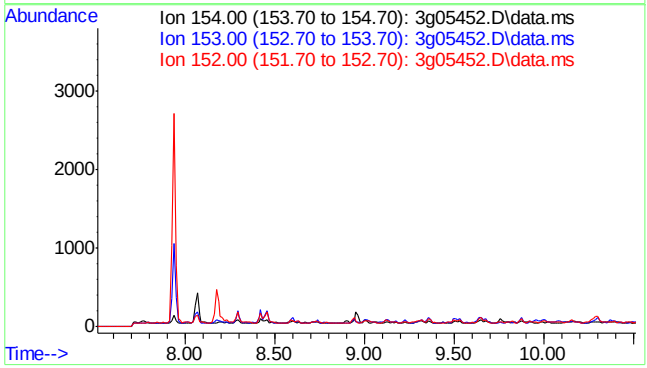

#10
Acenaphthylene
Concen: 0.00 ug/mL
RT: 8.731 min Scan# 625
Delta R.T. 0.012 min
Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion:152 Resp: 66

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 152 | 100 | | |
| 151 | 60.6 | 0.0 | 38.1# |
| 153 | 125.8 | 0.0 | 33.0# |





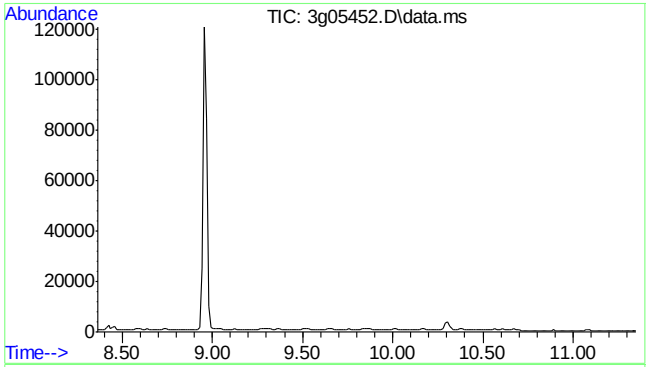



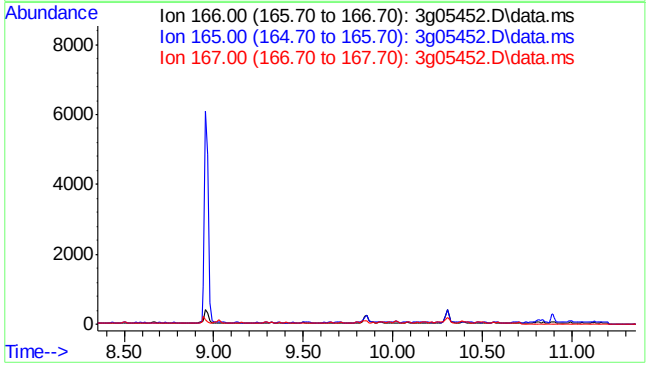

#11
Acenaphthene
Concen: N.D. ug/mL
Expected RT: 9.01 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 154

| Sig | Exp Ratio |
|---|---|
| 154 | 100 |
| 153 | 113.1 |
| 152 | 51.9 |



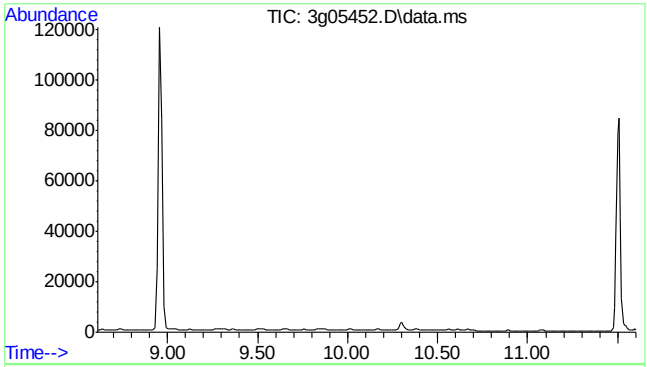



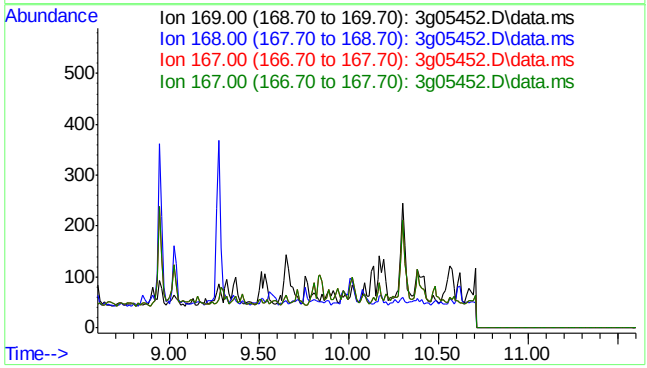

#12
Fluorene
Concen: N.D. ug/mL
Expected RT: 9.85 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 166

| Sig | Exp Ratio |
|---|---|
| 166 | 100 |
| 165 | 88.3 |
| 167 | 13.3 |



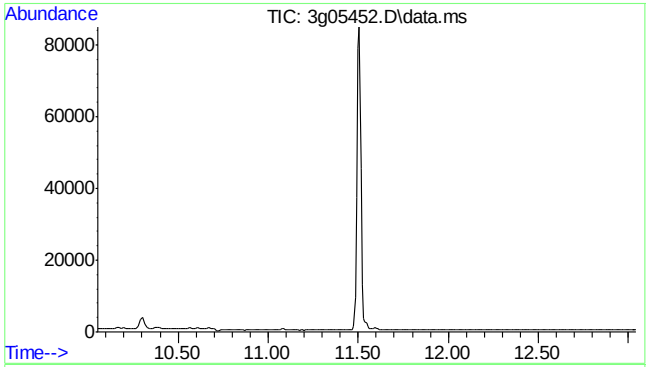



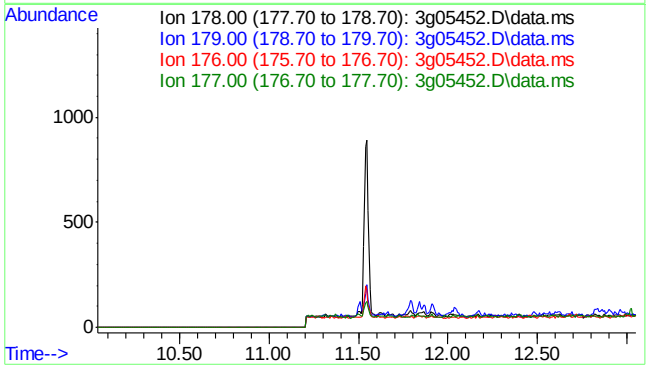

#13
Diphenylamine
Concen: N.D. ug/mL
Expected RT: 10.10 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 169

| Sig | Exp Ratio |
|---|---|
| 169 | 100 |
| 168 | 59.4 |
| 167 | 31.9 |
| 167 | 31.9 |



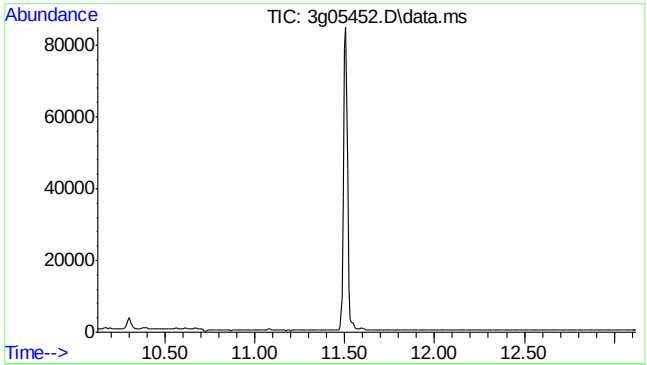



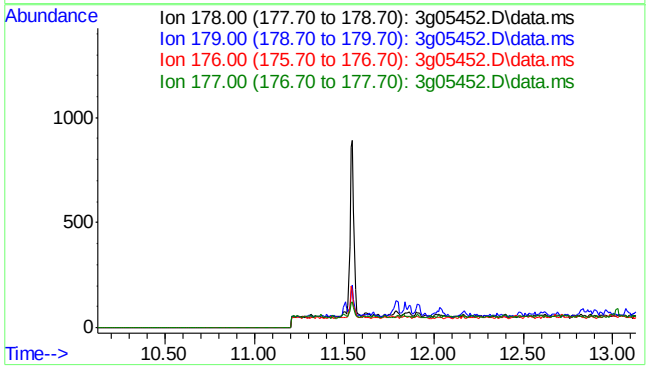

#15
Phenanthrene
Concen: N.D. ug/mL
Expected RT: 11.55 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 178

| Sig | Exp Ratio |
|---|---|
| 178 | 100 |
| 179 | 15.1 |
| 176 | 17.1 |
| 177 | 9.5 |



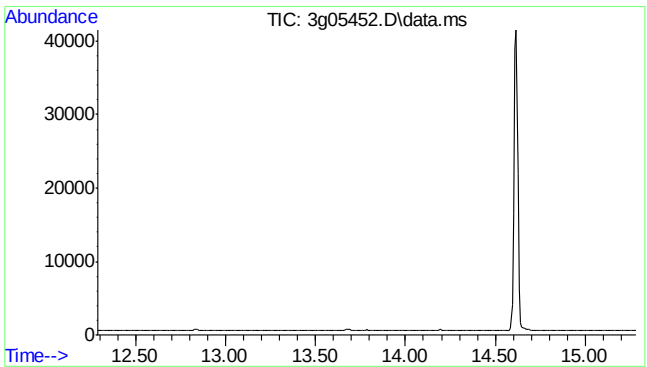



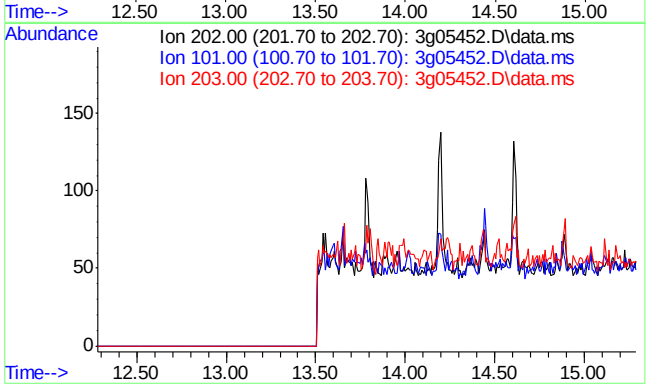

#16
Anthracene
Concen: N.D. ug/mL
Expected RT: 11.63 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 178

| Sig | Exp Ratio |
|---|---|
| 178 | 100 |
| 179 | 14.9 |
| 176 | 16.8 |
| 177 | 8.1 |



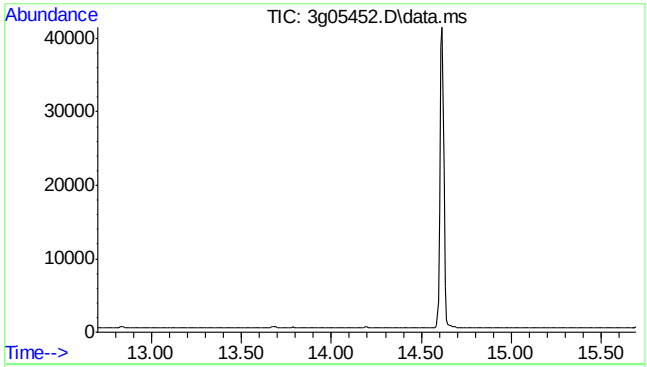



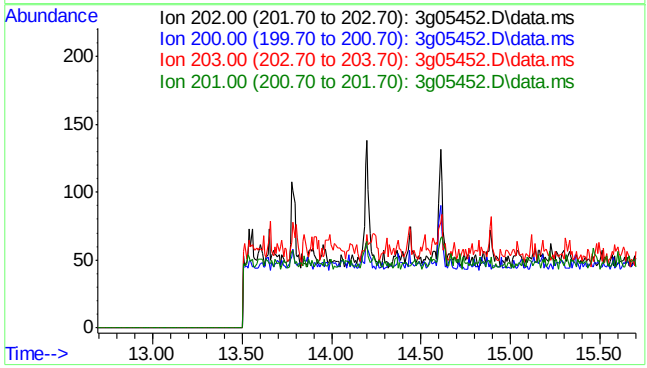

#17
Fluoranthene
Concen: N.D. ug/mL
Expected RT: 13.79 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 202

| Sig | Exp Ratio |
|---|---|
| 202 | 100 |
| 101 | 21.6 |
| 203 | 17.0 |



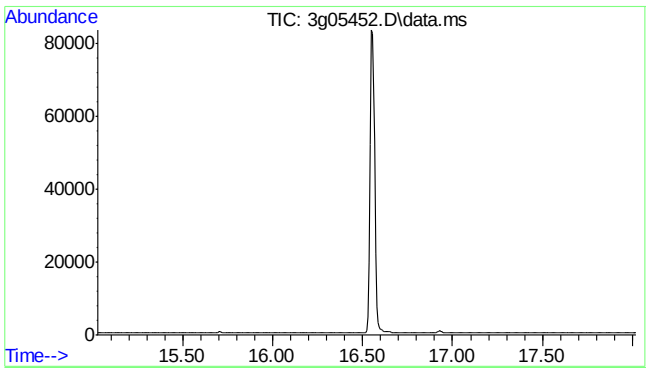



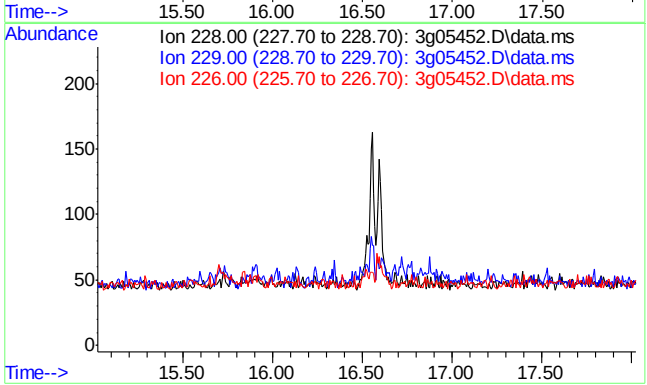

#19
Pyrene
Concen: N.D. ug/mL
Expected RT: 14.20 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 202

| Sig | Exp Ratio |
|---|---|
| 202 | 100 |
| 200 | 18.6 |
| 203 | 17.4 |
| 201 | 15.6 |



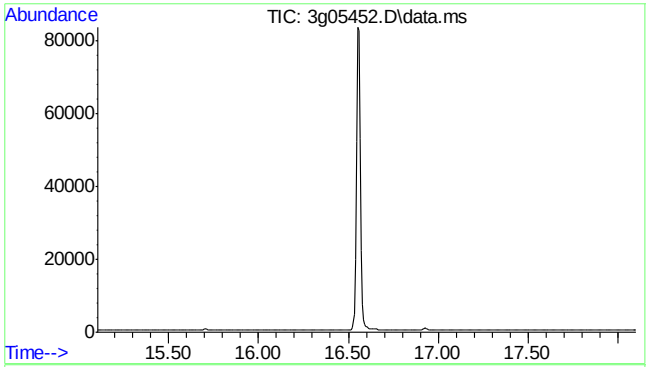



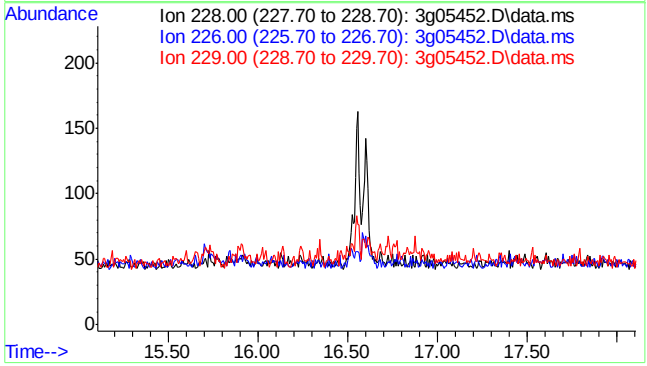

#21
Benzo(a)anthracene
Concen: N.D. ug/mL
Expected RT: 16.52 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 228

| Sig | Exp Ratio |
|---|---|
| 228 | 100 |
| 229 | 19.2 |
| 226 | 24.4 |



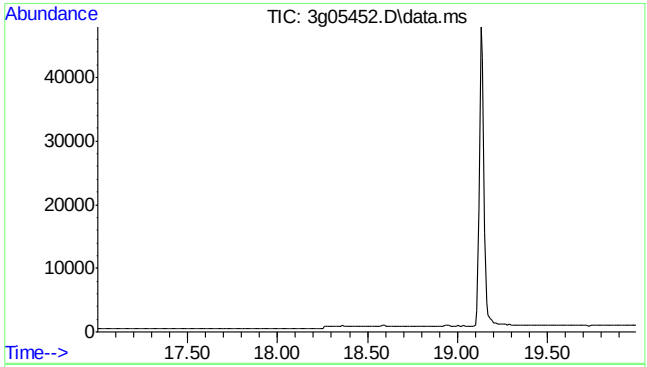



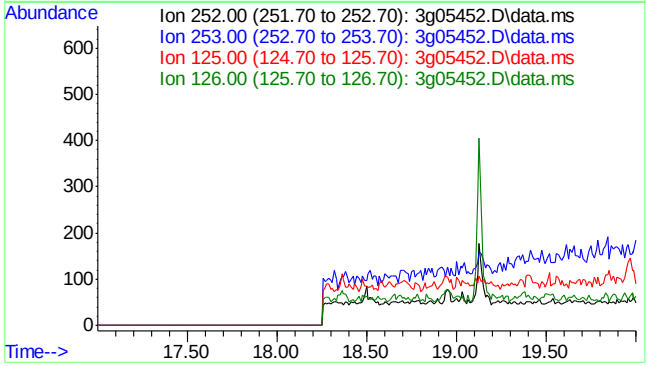

#22
Chrysene
Concen: N.D. ug/mL
Expected RT: 16.60 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 228

| Sig | Exp Ratio |
|---|---|
| 228 | 100 |
| 226 | 26.6 |
| 229 | 19.2 |



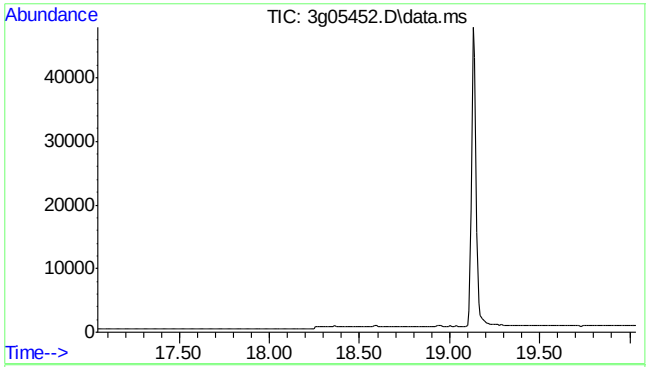



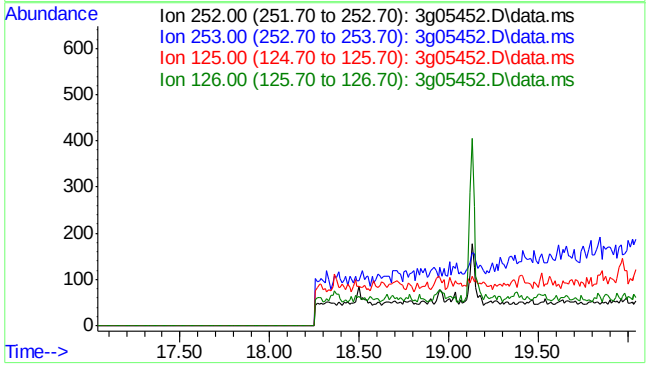

#24
Benzo(b)fluoranthene
Concen: N.D. ug/mL
Expected RT: 18.50 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 252

| Sig | Exp Ratio |
|---|---|
| 252 | 100 |
| 253 | 21.8 |
| 125 | 19.5 |
| 126 | 26.9 |



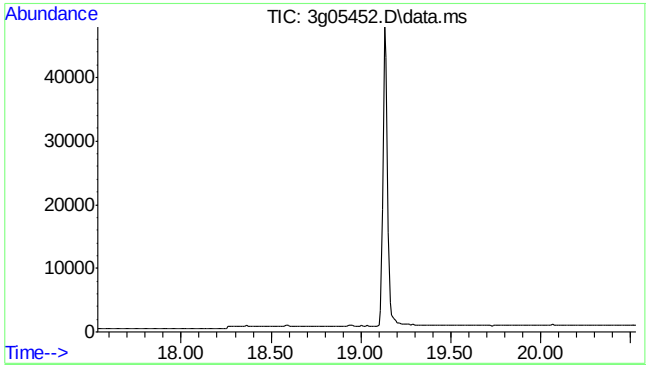



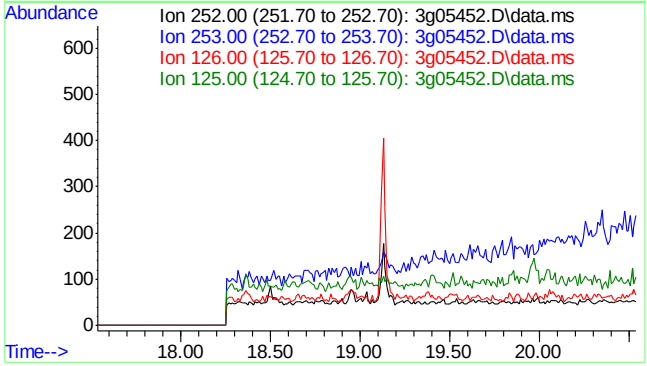

#25
Benzo(k)fluoranthene
Concen: N.D. ug/mL
Expected RT: 18.54 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 252

| Sig | Exp Ratio |
|---|---|
| 252 | 100 |
| 253 | 21.7 |
| 125 | 22.5 |
| 126 | 34.6 |



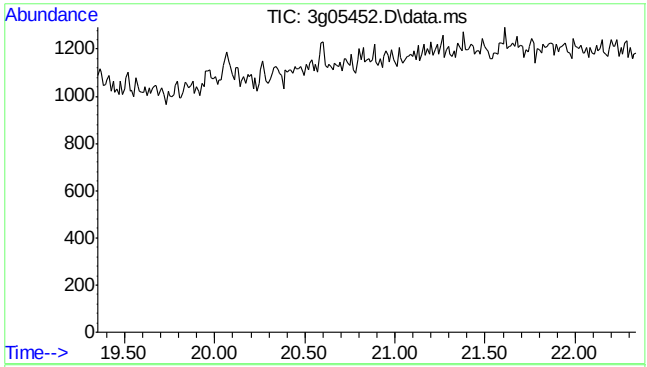



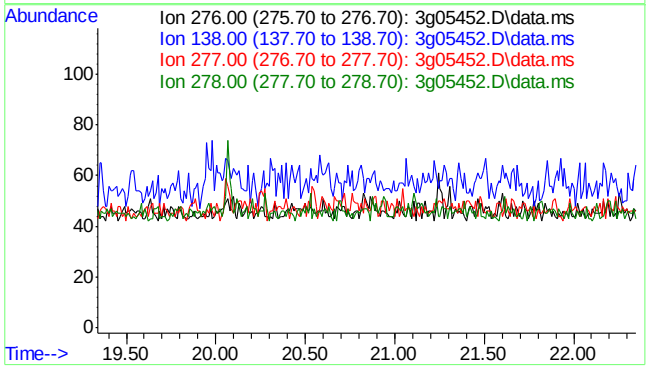

#26
Benzo(a)pyrene
Concen: N.D. ug/mL
Expected RT: 19.04 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 252

| Sig | Exp Ratio |
|---|---|
| 252 | 100 |
| 253 | 21.4 |
| 126 | 30.2 |
| 125 | 21.8 |



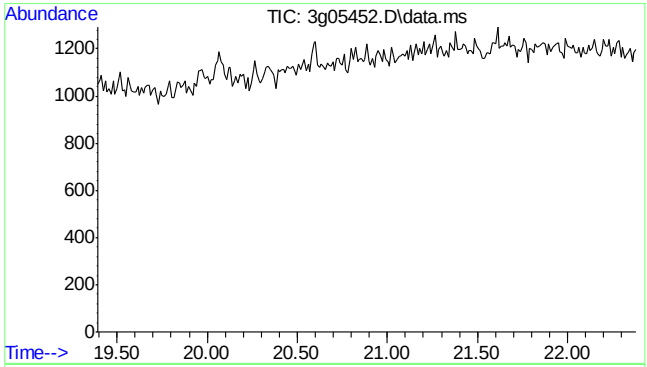



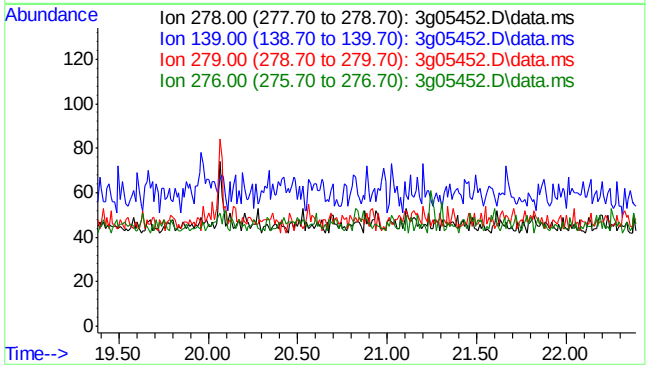

#27
Indeno(1,2,3-cd)pyrene
Concen: N.D. ug/mL
Expected RT: 20.84 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 276

| Sig | Exp Ratio |
|---|---|
| 276 | 100 |
| 138 | 46.3 |
| 277 | 32.4 |
| 278 | 0.0 |



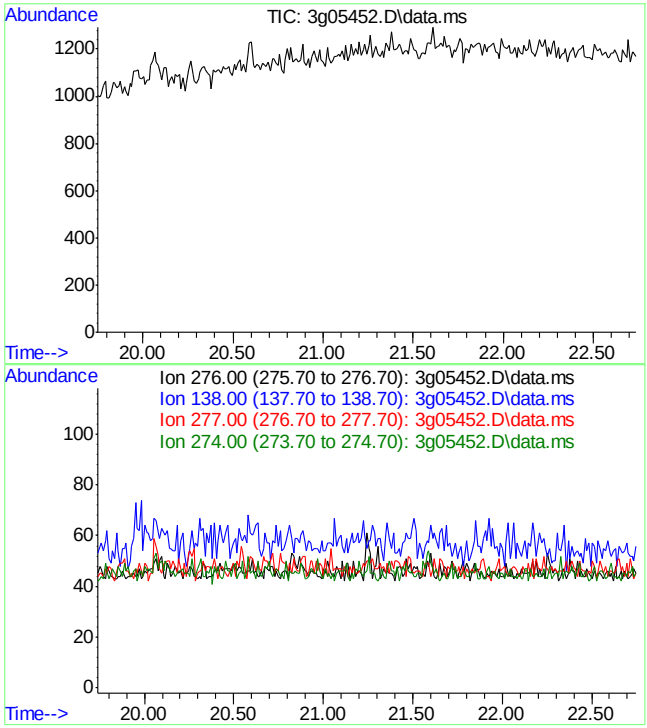




#28
Dibenz(a,h)anthracene
Concen: N.D. ug/mL
Expected RT: 20.89 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 278

| Sig | Exp Ratio |
|---|---|
| 278 | 100 |
| 139 | 38.1 |
| 279 | 23.1 |
| 276 | 119.7 |




#29
Benzo(g,h,i)perylene
Concen: N.D. ug/mL
Expected RT: 21.24 min

Lab File: 3g05452.D
Acq: 16 Aug 11 12:05 am

Tgt Ion: 276

| Sig | Exp Ratio |
|---|---|
| 276 | 100 |
| 138 | 49.0 |
| 277 | 23.1 |
| 274 | 19.4 |

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081511\
Data File : 3g05443.D
Acq On : 15 Aug 2011 6:17 pm
Operator : TamiB
Sample : OP4232-MB
Misc :
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Aug 16 09:18:39 2011
Quant Method : C:\msdchem\1\METHODS\SIMPE3G198.M
Quant Title : PAHSIM BASE
QLast Update : Tue Aug 09 09:37:56 2011
Response via : Initial Calibration

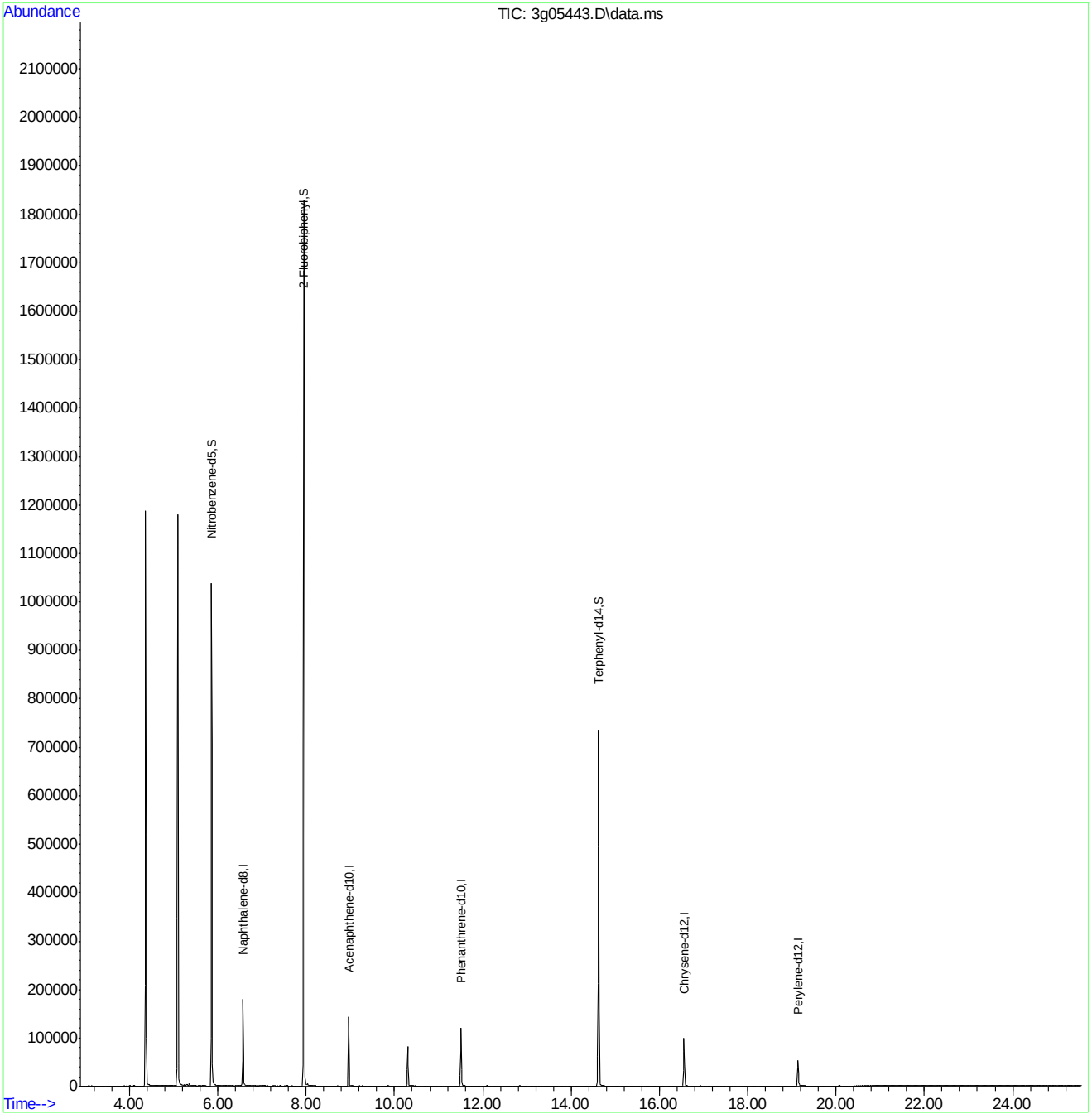
| Compound | R.T. | QIon | Response | Conc | Units | | Dev(Min) |
|---|---|---|---|---|---|---|---|
| Internal Standards | | | | | | | |
| 1) Naphthalene-d8 | 6.568 | 136 | 173015 | 4.00 | ug/mL | | 0.00 |
| 6) Acenaphthene-d10 | 8.967 | 164 | 89509 | 4.00 | ug/mL | | 0.00 |
| 14) Phenanthrene-d10 | 11.506 | 188 | 128276 | 4.00 | ug/mL | | 0.00 |
| 18) Chrysene-d12 | 16.558 | 240 | 94773 | 4.00 | ug/mL | | 0.00 |
| 23) Perylene-d12 | 19.140 | 264 | 66000 | 4.00 | ug/mL | | 0.00 |
| System Monitoring Compounds | | | | | | | |
| 2) Nitrobenzene-d5 | 5.857 | 82 | 592018 | 43.85 | ug/mL | | 0.00 |
| 7) 2-Fluorobiphenyl | 7.951 | 172 | 1505036 | 44.62 | ug/mL | | 0.00 |
| 20) Terphenyl-d14 | 14.624 | 244 | 760541 | 46.05 | ug/mL | | 0.00 |
| Target Compounds | | | | | | | Qvalue |
| 3) N-Nitrosodimethylamine | 0.000 | | 0 | N.D. | d | | |
| 4) N-Nitrosodi-propylamine | 0.000 | | 0 | N.D. | d | | |
| 5) Naphthalene | 6.593 | 128 | 2389 | Below Cal | | | 95 |
| 8) 2-Methylnaphthalene | 7.416 | 142 | 380 | Below Cal | | | 90 |
| 9) 1-Methylnaphthalene | 7.565 | 142 | 241 | Below Cal | | # | 89 |
| 10) Acenaphthylene | 0.000 | | 0 | N.D. | d | | |
| 11) Acenaphthene | 9.015 | 154 | 167 | Below Cal | | # | 78 |
| 12) Fluorene | 0.000 | | 0 | N.D. | d | | |
| 13) Diphenylamine | 0.000 | | 0 | N.D. | d | | |
| 15) Phenanthrene | 11.546 | 178 | 469 | Below Cal | | | 96 |
| 16) Anthracene | 0.000 | | 0 | N.D. | d | | |
| 17) Fluoranthene | 0.000 | | 0 | N.D. | d | | |
| 19) Pyrene | 0.000 | | 0 | N.D. | d | | |
| 21) Benzo(a)anthracene | 0.000 | | 0 | N.D. | d | | |
| 22) Chrysene | 16.604 | 228 | 244 | Below Cal | | | 96 |
| 24) Benzo(b)fluoranthene | 0.000 | | 0 | N.D. | d | | |
| 25) Benzo(k)fluoranthene | 0.000 | | 0 | N.D. | d | | |
| 26) Benzo(a)pyrene | 0.000 | | 0 | N.D. | d | | |
| 27) Indeno(1,2,3-cd)pyrene | 0.000 | | 0 | N.D. | d | | |
| 28) Dibenz(a,h)anthracene | 0.000 | | 0 | N.D. | d | | |
| 29) Benzo(g,h,i)perylene | 20.855 | 276 | 138 | Below Cal | | | 81 |

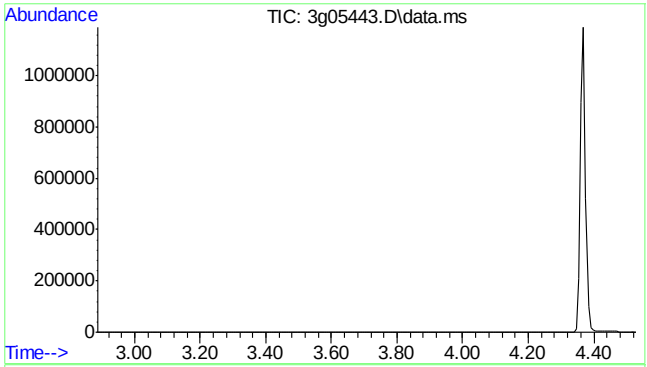
(#) = qualifier out of range (m) = manual integration (+) = signals summed

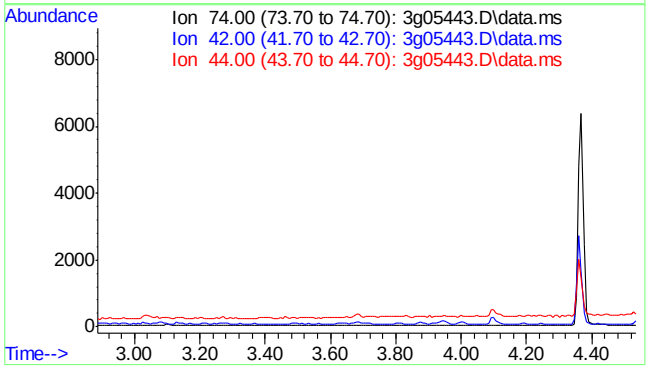
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\081511\
Data File : 3g05443.D
Acq On : 15 Aug 2011 6:17 pm
Operator : TamiB
Sample : OP4232-MB
Misc :
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Aug 16 09:18:39 2011
Quant Method : C:\msdchem\1\METHODS\SIMPE3G198.M
Quant Title : PAHSIM BASE
QLast Update : Tue Aug 09 09:37:56 2011
Response via : Initial Calibration





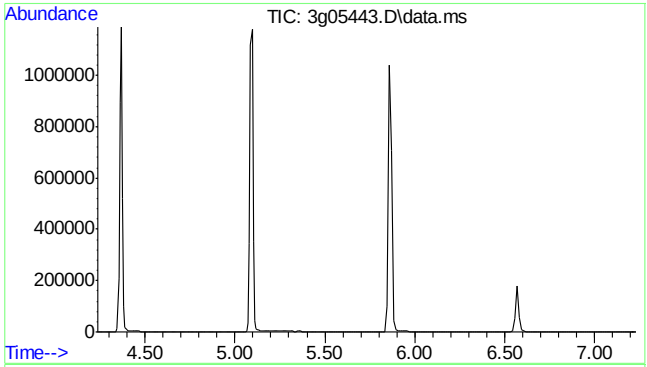



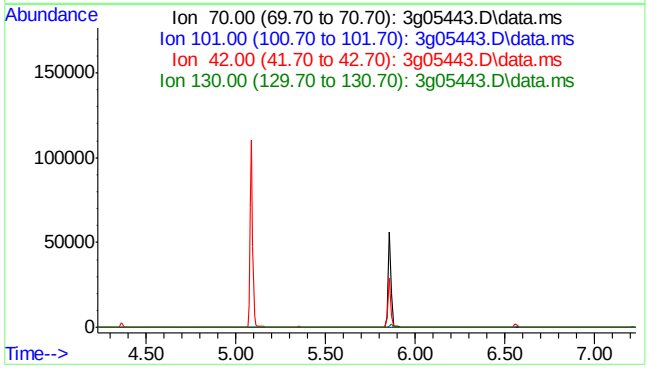

#3
N-Nitrosodimethylamine
Concen: N.D. ug/mL
Expected RT: 3.03 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 74

| Sig | Exp Ratio |
|---|---|
| 74 | 100 |
| 42 | 59.7 |
| 44 | 5.1 |



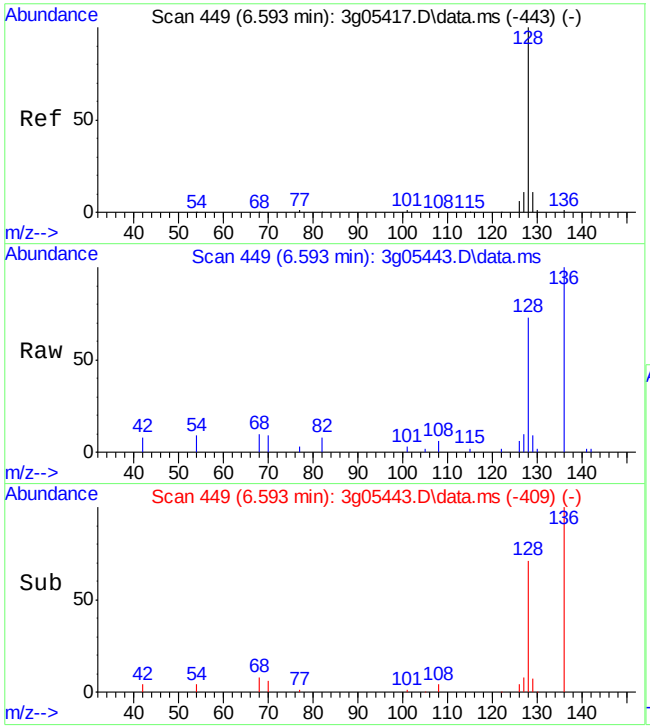




#4
N-Nitrosodi-propylamine
Concen: N.D. ug/mL
Expected RT: 5.73 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 70

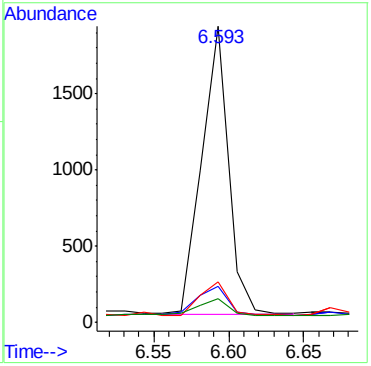
| Sig | Exp Ratio |
|---|---|
| 70 | 100 |
| 101 | 14.4 |
| 42 | 63.2 |
| 130 | 37.8 |

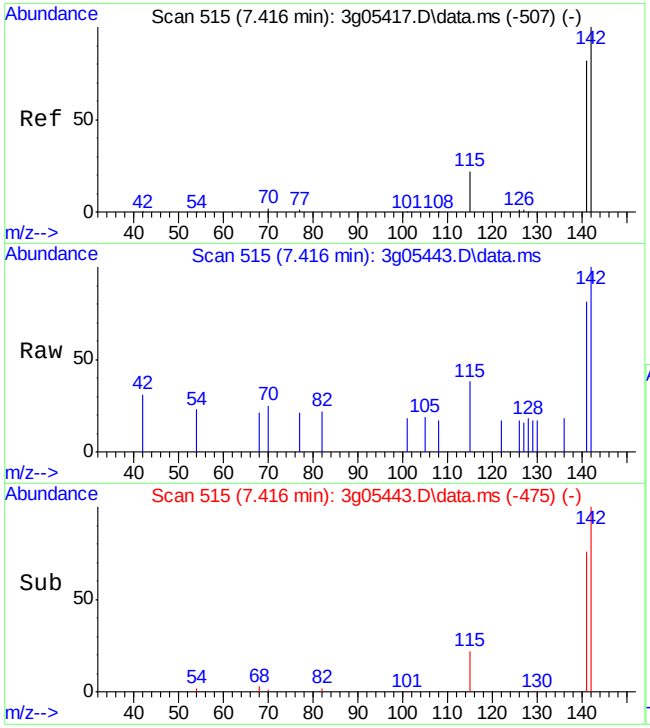



#5
Naphthalene
Concen: Below ug/mL
RT: 6.593 min Scan# 449
Delta R.T. -0.000 min
Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion:128 Resp: 2389

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 128 | 100 | | |
| 129 | 12.6 | 0.0 | 30.8 |
| 127 | 13.9 | 0.0 | 31.6 |
| 126 | 7.8 | 0.0 | 26.4 |

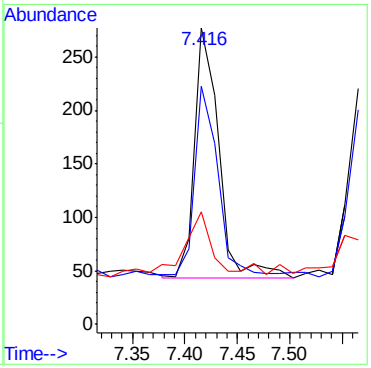


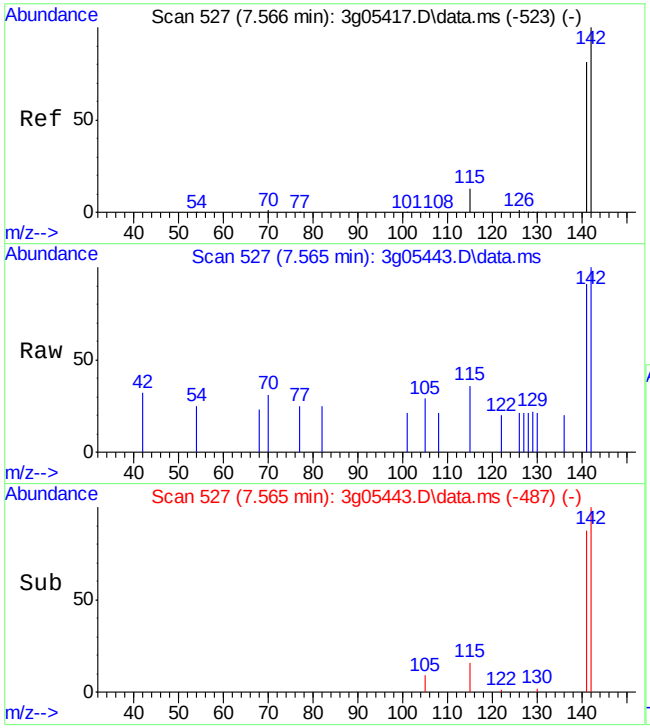




#8
2-Methylnaphthalene
Concen: Below ug/mL
RT: 7.416 min Scan# 515
Delta R.T. -0.000 min
Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion:142 Resp: 380

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 142 | 100 | | |
| 141 | 73.9 | 60.1 | 100.1 |
| 115 | 33.4 | 2.7 | 42.7 |

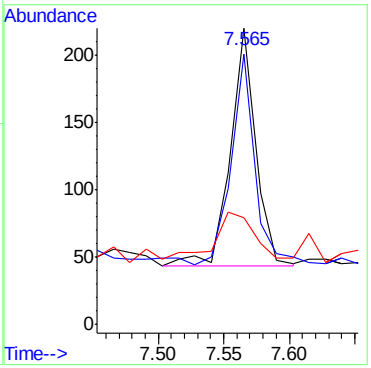


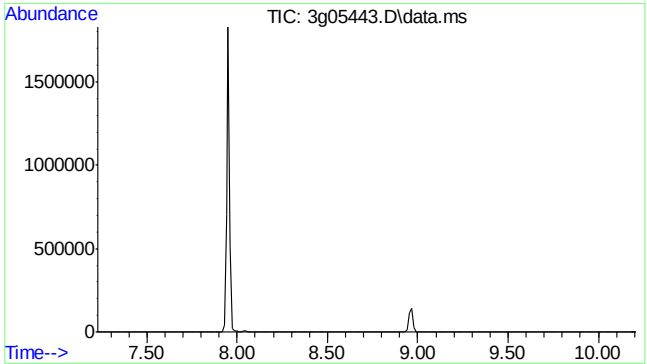



#9
1-Methylnaphthalene
Concen: Below ug/mL
RT: 7.565 min Scan# 527
Delta R.T. -0.000 min
Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion:142 Resp: 241

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 142 | 100 | | |
| 141 | 83.0 | 66.9 | 100.3 |
| 115 | 0.0 | 19.0 | 28.4# |



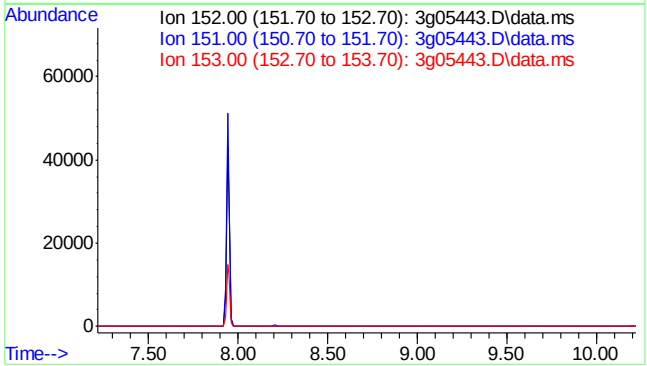



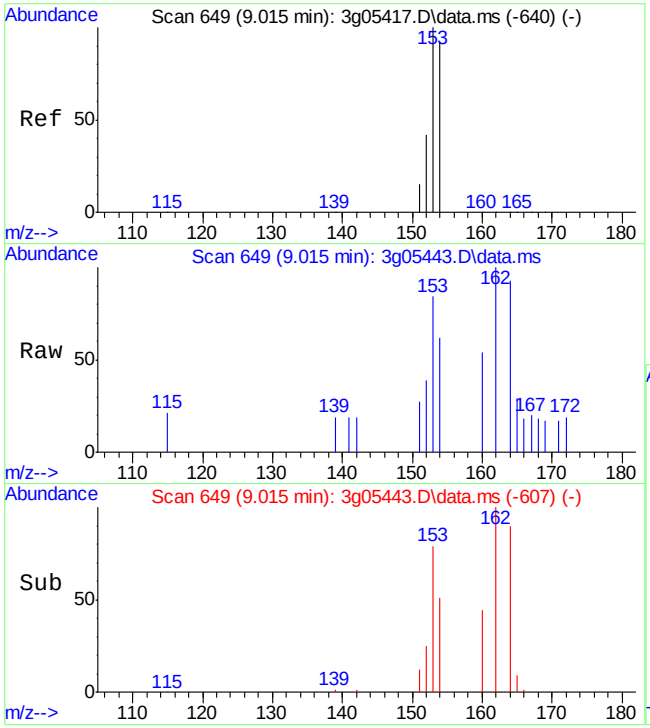

#10
Acenaphthylene
Concen: N.D. ug/mL
Expected RT: 8.72 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 152

| Sig | Exp Ratio |
|---|---|
| 152 | 100 |
| 151 | 18.1 |
| 153 | 13.0 |

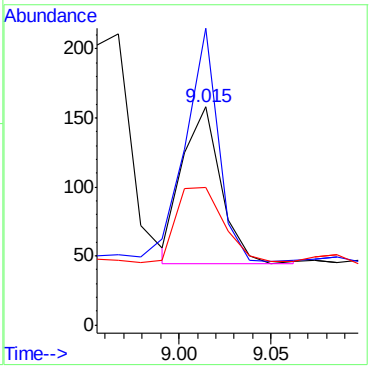


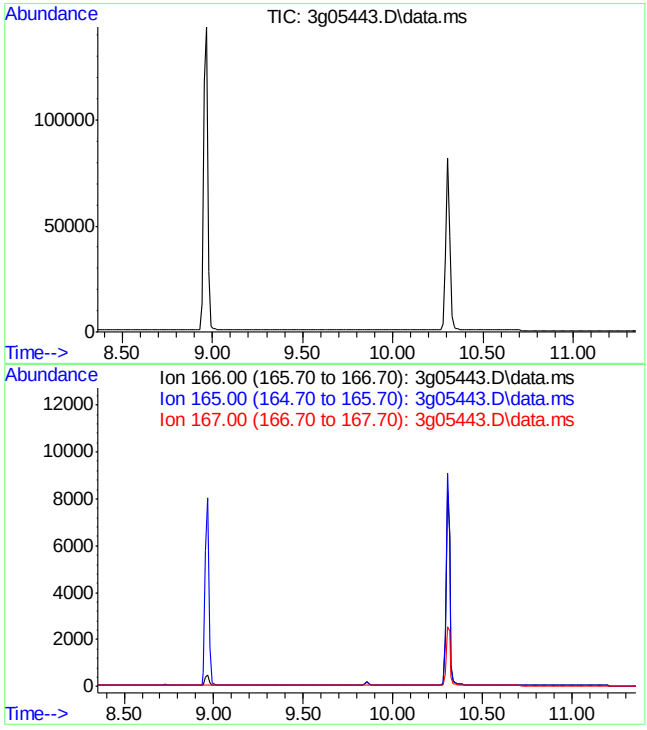



#11
Acenaphthene
Concen: Below ug/mL
RT: 9.015 min Scan# 649
Delta R.T. -0.000 min
Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion:154 Resp: 167

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 154 | 100 | | |
| 153 | 142.5 | 93.1 | 133.1# |
| 152 | 59.3 | 31.9 | 71.9 |



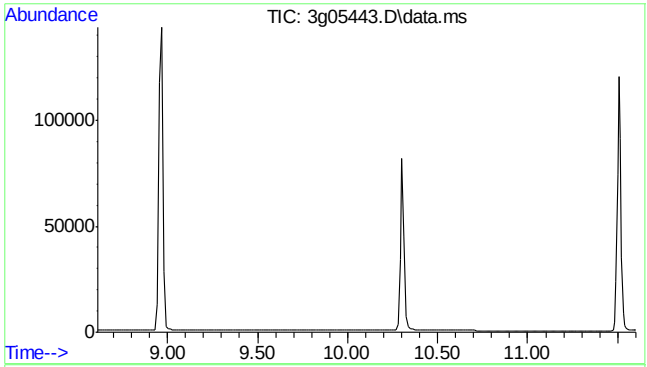




#12
Fluorene
Concen: N.D. ug/mL
Expected RT: 9.85 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 166

| Sig | Exp Ratio |
|---|---|
| 166 | 100 |
| 165 | 88.3 |
| 167 | 13.3 |

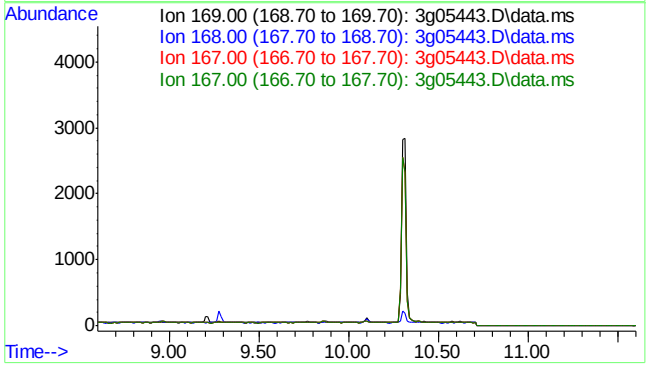


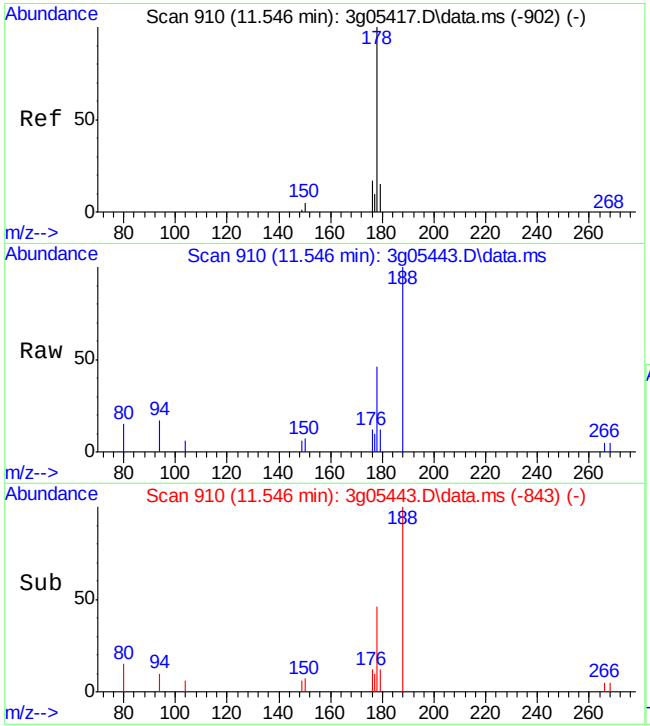

#13
Diphenylamine
Concen: N.D. ug/mL
Expected RT: 10.10 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 169

| Sig | Exp Ratio |
|---|---|
| 169 | 100 |
| 168 | 59.4 |
| 167 | 31.9 |
| 167 | 31.9 |

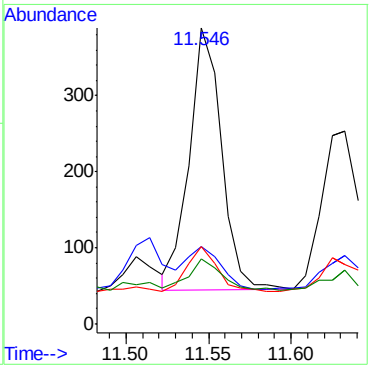


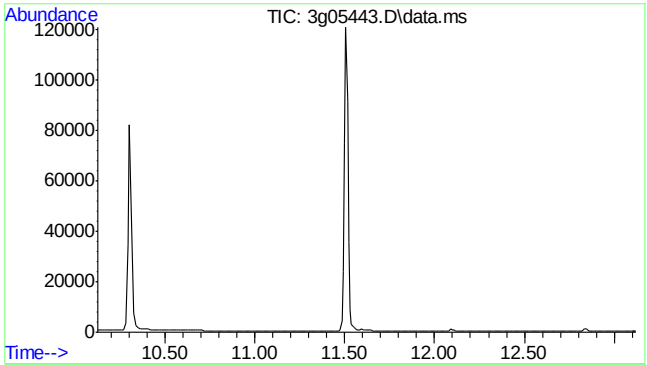



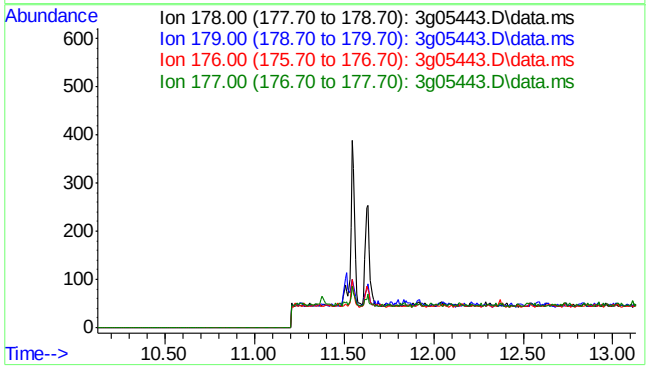

#15
Phenanthrene
Concen: Below ug/mL
RT: 11.546 min Scan# 910
Delta R.T. -0.000 min
Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion:178 Resp: 469

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 178 | 100 | | |
| 179 | 17.1 | 0.0 | 35.1 |
| 176 | 16.4 | 0.0 | 37.1 |
| 177 | 12.4 | 0.0 | 29.5 |





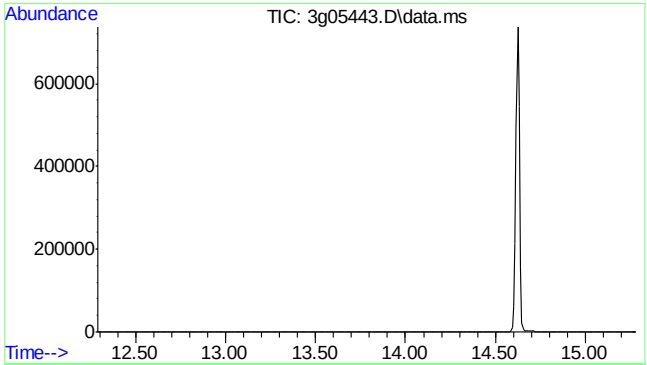



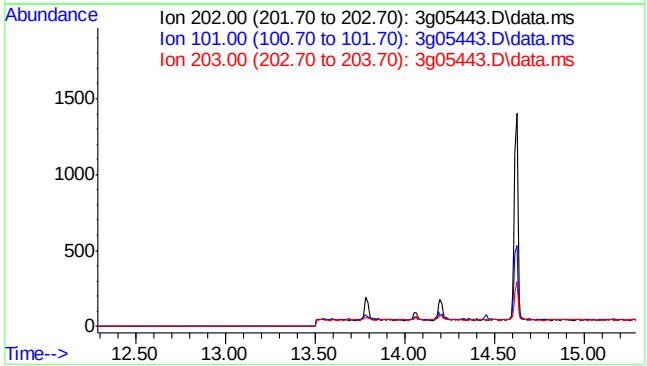

#16
Anthracene
Concen: N.D. ug/mL
Expected RT: 11.63 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 178

| Sig | Exp Ratio |
|---|---|
| 178 | 100 |
| 179 | 14.9 |
| 176 | 16.8 |
| 177 | 8.1 |



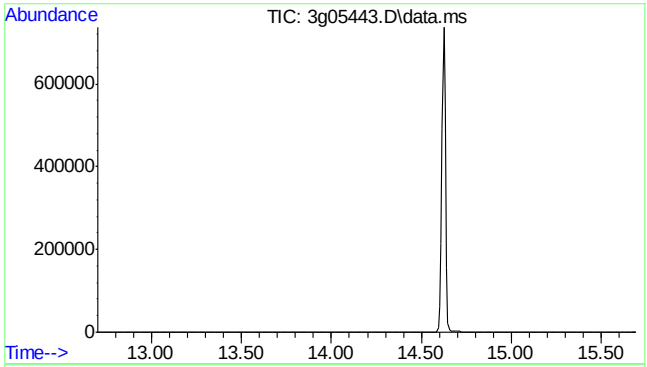



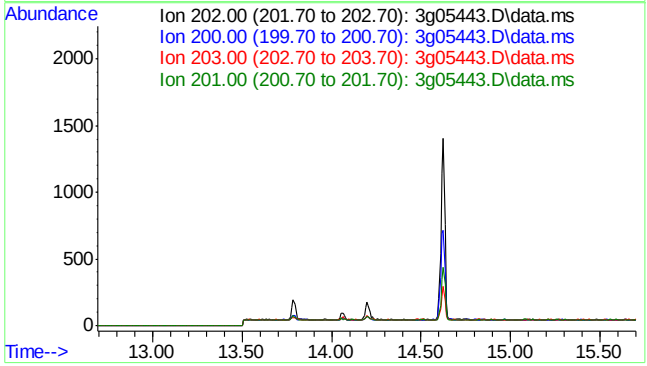

#17
Fluoranthene
Concen: N.D. ug/mL
Expected RT: 13.79 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 202

| Sig | Exp Ratio |
|---|---|
| 202 | 100 |
| 101 | 21.6 |
| 203 | 17.0 |



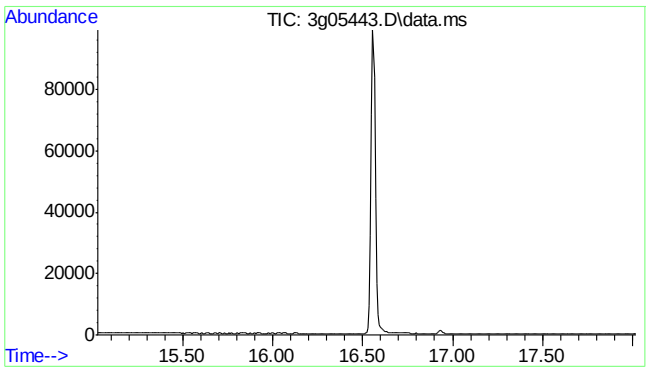



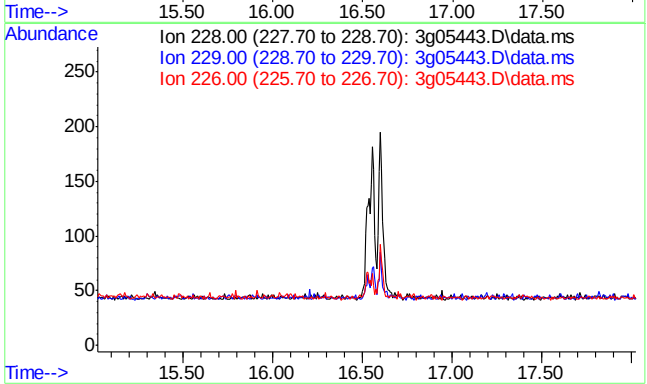

#19
Pyrene
Concen: N.D. ug/mL
Expected RT: 14.20 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 202

| Sig | Exp Ratio |
|---|---|
| 202 | 100 |
| 200 | 18.6 |
| 203 | 17.4 |
| 201 | 15.6 |



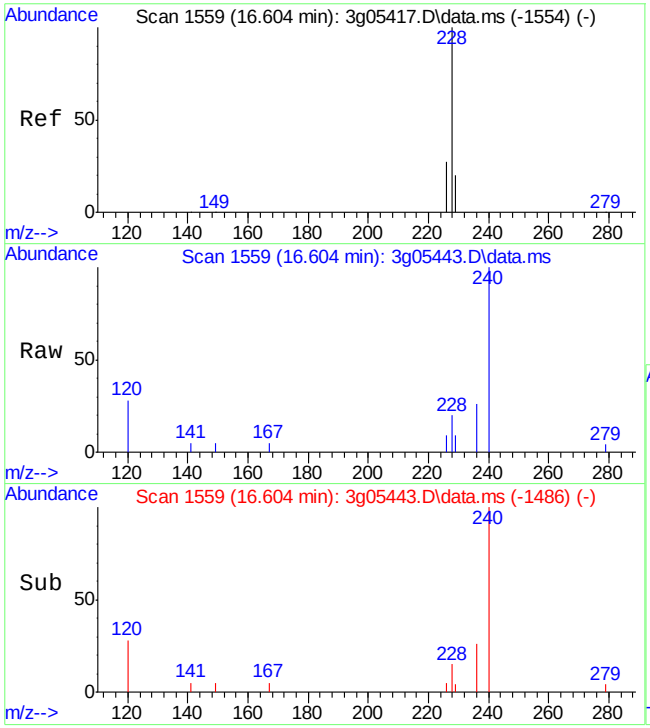




#21
Benzo(a)anthracene
Concen: N.D. ug/mL
Expected RT: 16.52 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 228

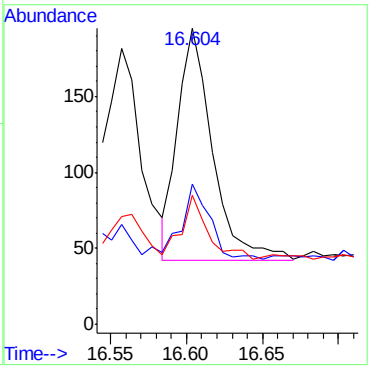
| Sig | Exp Ratio |
|---|---|
| 228 | 100 |
| 229 | 19.2 |
| 226 | 24.4 |

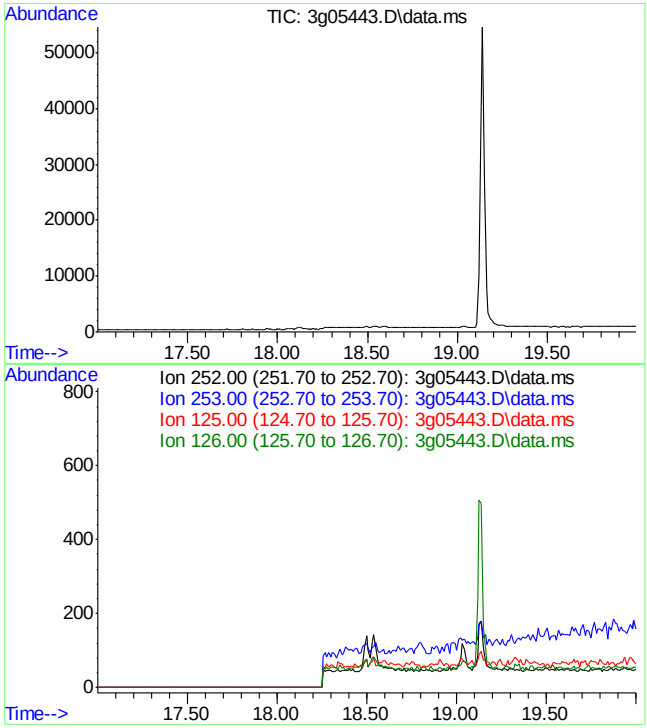



#22
Chrysene
Concen: Below ug/mL
RT: 16.604 min Scan# 1559
Delta R.T. -0.000 min
Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion:228 Resp: 244

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 228 | 100 | | |
| 226 | 27.0 | 6.6 | 46.6 |
| 229 | 22.5 | 0.0 | 39.2 |



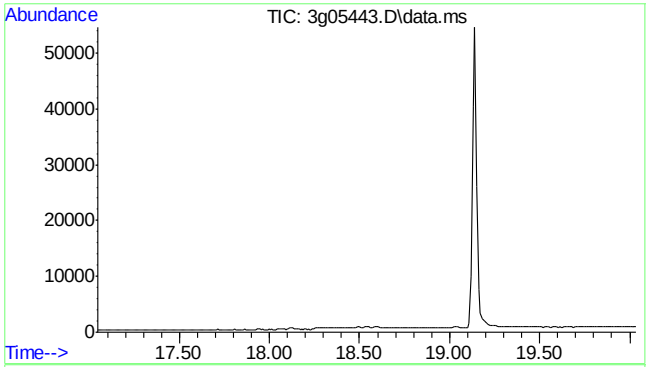



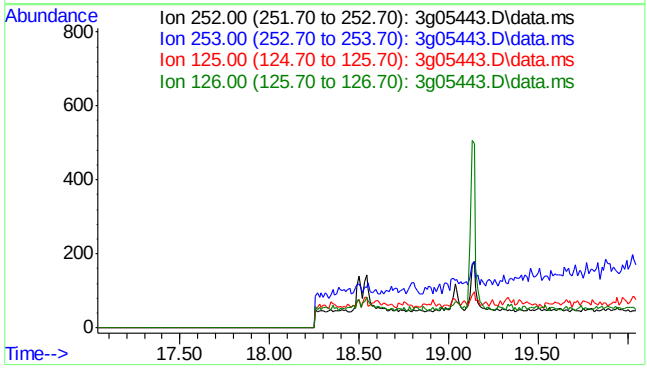

#24
Benzo(b)fluoranthene
Concen: N.D. ug/mL
Expected RT: 18.50 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 252

| Sig | Exp Ratio |
|---|---|
| 252 | 100 |
| 253 | 21.8 |
| 125 | 19.5 |
| 126 | 26.9 |



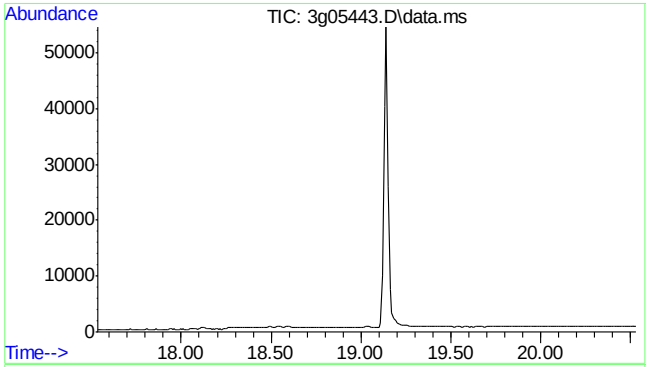



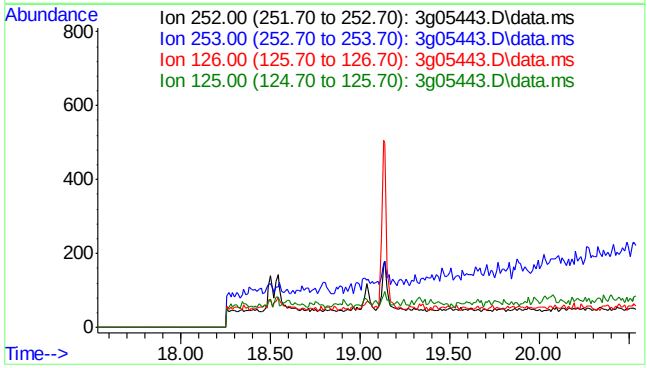

#25
Benzo(k)fluoranthene
Concen: N.D. ug/mL
Expected RT: 18.54 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 252

| Sig | Exp Ratio |
|---|---|
| 252 | 100 |
| 253 | 21.7 |
| 125 | 22.5 |
| 126 | 34.6 |



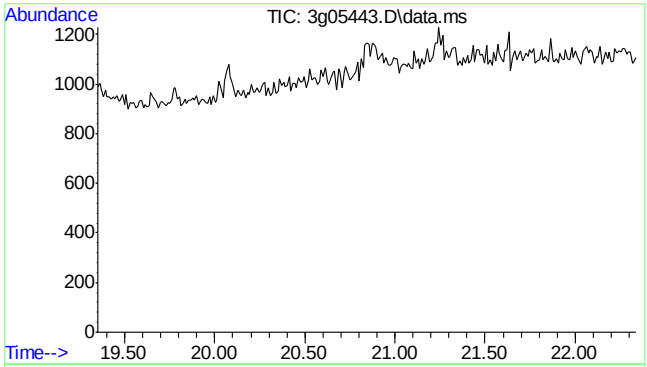




#26
Benzo(a)pyrene
Concen: N.D. ug/mL
Expected RT: 19.04 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 252

| Sig | Exp Ratio |
|---|---|
| 252 | 100 |
| 253 | 21.4 |
| 126 | 30.2 |
| 125 | 21.8 |

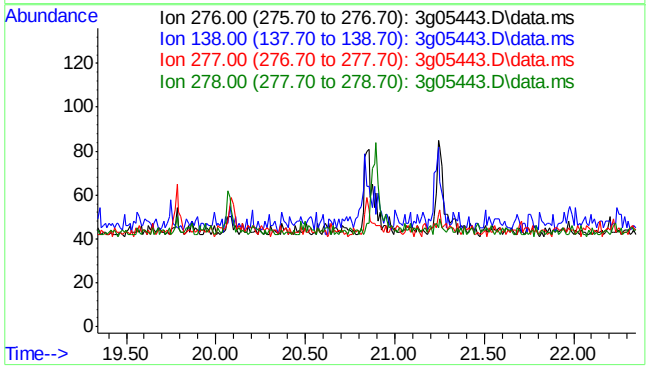


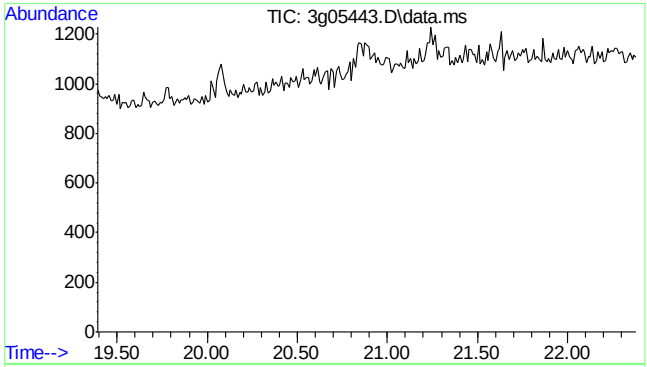

#27
Indeno(1,2,3-cd)pyrene
Concen: N.D. ug/mL
Expected RT: 20.84 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 276

| Sig | Exp Ratio |
|---|---|
| 276 | 100 |
| 138 | 46.3 |
| 277 | 32.4 |
| 278 | 0.0 |



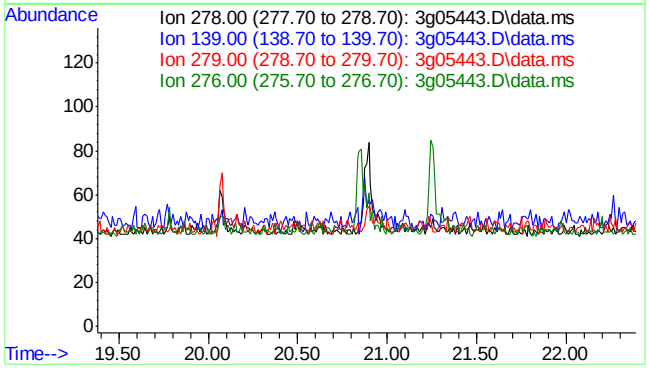



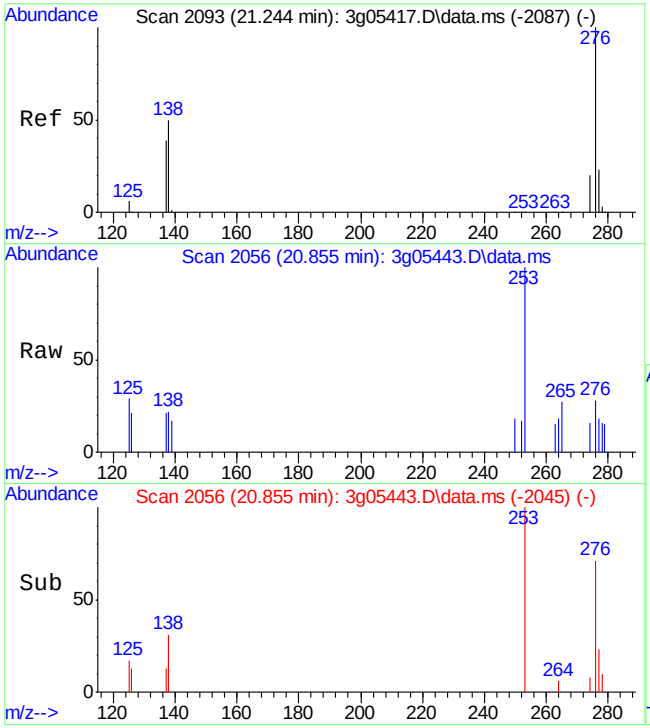

#28
Dibenz(a,h)anthracene
Concen: N.D. ug/mL
Expected RT: 20.89 min

Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion: 278

| Sig | Exp Ratio |
|---|---|
| 278 | 100 |
| 139 | 38.1 |
| 279 | 23.1 |
| 276 | 119.7 |

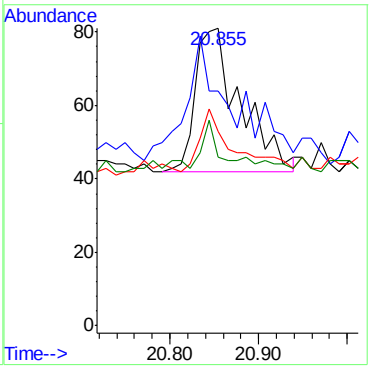





#29
Benzo(g,h,i)perylene
Concen: Below ug/mL
RT: 20.855 min Scan# 2056
Delta R.T. -0.388 min
Lab File: 3g05443.D
Acq: 15 Aug 11 6:17 pm

Tgt Ion:276 Resp: 138

| Ion | Ratio | Lower | Upper |
|---|---|---|---|
| 276 | 100 | | |
| 138 | 63.8 | 29.0 | 69.0 |
| 277 | 32.6 | 3.1 | 43.1 |
| 274 | 13.8 | 0.0 | 39.4 |



Mountain States ACCUTEST LABORATORIES

## GC 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:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GGB705-MB | GB12368.D | 1 | 08/14/11 | SK | n/a | n/a | GGB705 |

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

D26397-1

| 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 | 89% | 60-140% |

# Blank Spike Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GGB705-BS | GB12369.D | 1 | 08/14/11 | SK | n/a | n/a | GGB705 |

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

D26397-1

| CAS No. | Compound | Spike mg/kg | BSP mg/kg | BSP % | Limits |
|---|---|---|---|---|---|
| | TPH-GRO (C6-C10) | 110 | 113 | 103 | 70-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 120-82-1 | 1,2,4-Trichlorobenzene | 101% | 60-140% |

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| D26288-7MS | GB12371.D | 1 | 08/14/11 | SK | n/a | n/a | GGB705 |
| D26288-7MSD | GB12372.D | 1 | 08/14/11 | SK | n/a | n/a | GGB705 |
| D26288-7 | GB12370.D | 1 | 08/14/11 | SK | n/a | n/a | GGB705 |

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

D26397-1

| CAS No. | Compound | D26288-7 mg/kg | Q | Spike mg/kg | MS mg/kg | MS % | MSD mg/kg | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| | TPH-GRO (C6-C10) | ND | | 137 | 147 | 107 | 148 | 108 | 1 | 70-130/30 |

| CAS No. | Surrogate Recoveries | MS | MSD | D26288-7 | Limits |
|---|---|---|---|---|---|
| 120-82-1 | 1,2,4-Trichlorobenzene | 98% | 98% | 83% | 60-140% |

Mountain States ACCUTEST LABORATORIES

GC Volatiles

Raw Data

Manual Integrations APPROVED
(compounds with "m" flag)
Koroush Vaziri
08/16/11 14:55

Quantitation Report (QT Reviewed)

Signal #1 : Y:\1\DATA\081411\GB12391.D\FID1A.CH Vial: 26
Signal #2 : Y:\1\DATA\081411\GB12391.D\FID2B.CH
Acq On : 15 Aug 2011 7:27 am Operator: StephK
Sample : D26397-1, 50X Inst : GC/MS Ins
Misc : GC2136,GGB705,5.007,,100,5,1 Multiplr: 1.00
IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E
Quant Time: Aug 15 08:38:50 2011 Quant Results File: TB630GB630SOIL.RES

Quant Method : C:\MSDCHEM\1...\TB630GB630SOIL.M (Chemstation Integrator)
Title : 8015B/8021B TVH/BTEX
Last Update : Tue Aug 09 08:19:25 2011
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 | 14.31 | 3148740 | 81.351 | % | m |
| 10) S | 1,2,4-Trichlorobenzene (P) | 14.31 | 27577003 | 81.769 | % | |
| | **Target Compounds** | | | | | |
| 1) H | TVH-Gasoline | 7.21 | 3152429 | <MDL | mg/L | |
| 4) T | Methyl-t-butyl-ether | 0.00 | 0 | N.D. | ug/L | d |
| 5) T | Benzene | 4.03 | 165618 | 0.244 | ug/L | |
| 6) T | Toluene | 7.53 | 543531 | 0.832 | ug/L | |
| 7) T | Ethylbenzene | 10.19 | 106880 | 0.186 | ug/L | |
| 8) T | m,p-Xylene | 10.37 | 605971 | 0.894 | ug/L | |
| 9) T | o-Xylene | 10.88 | 224631 | 0.395 | ug/L | |
| 11) T | Naphthalene | 14.49 | 789515 | 2.466 | ug/L | |

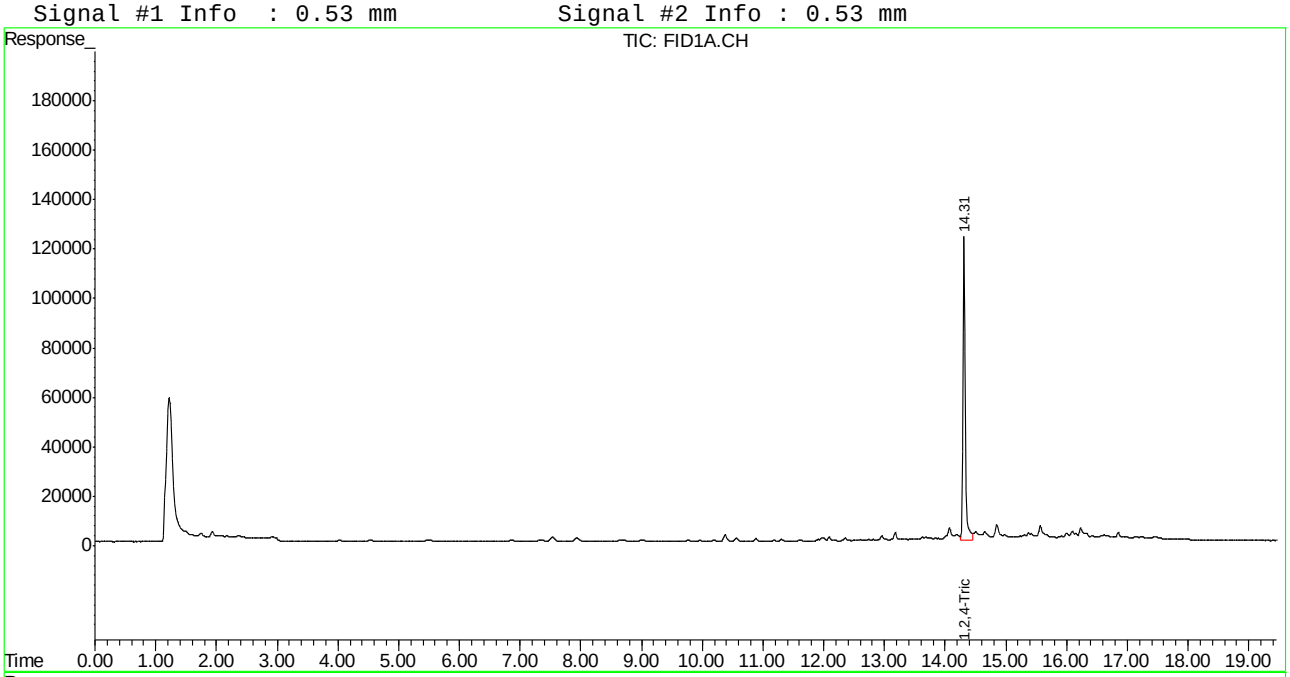
(f)=RT Delta > 1/2 Window (m)=manual int.
GB12391.D TB630GB630SOIL.M Mon Aug 15 09:04:58 2011 GC Page 1

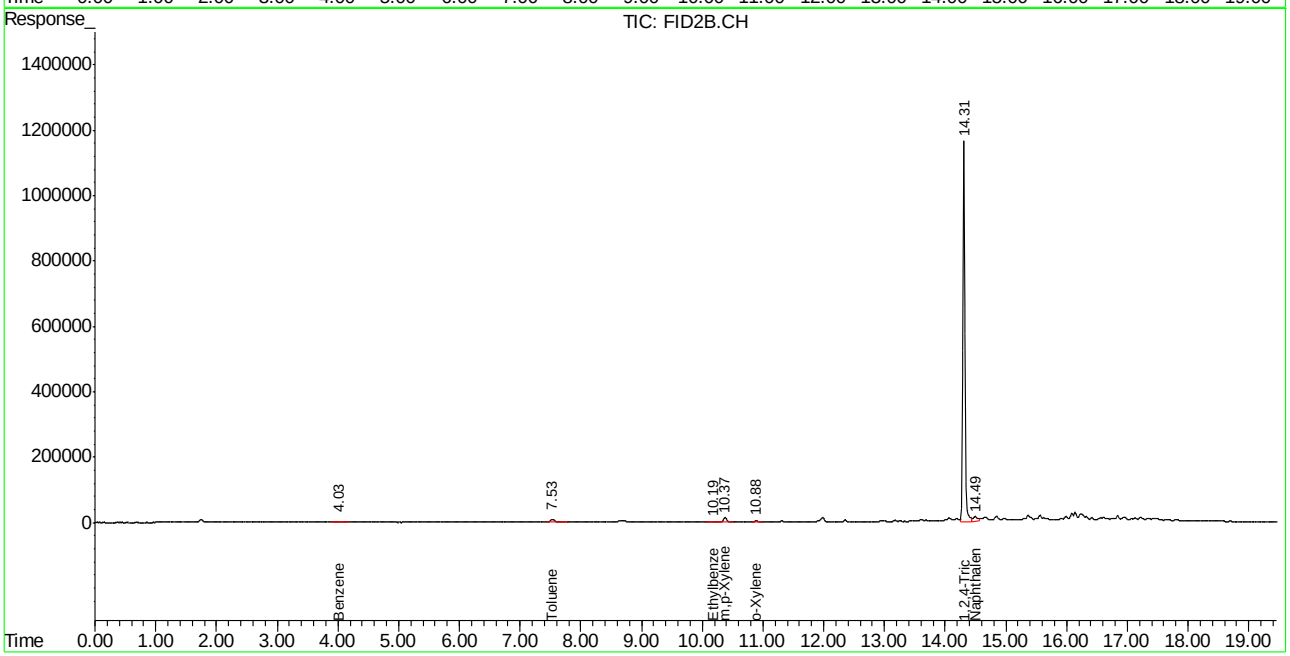
Quantitation Report (QT Reviewed)

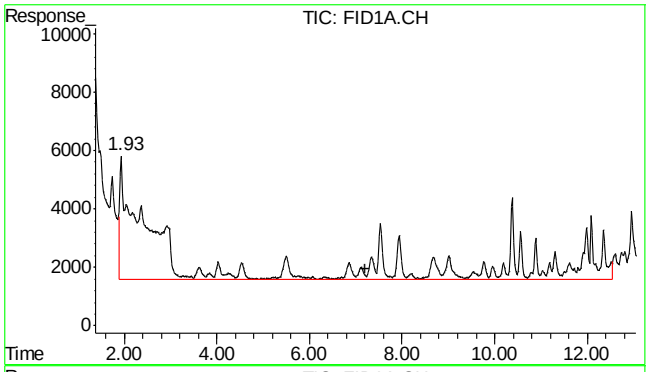
Signal #1 : Y:\1\DATA\081411\GB12391.D\FID1A.CH Vial: 26
Signal #2 : Y:\1\DATA\081411\GB12391.D\FID2B.CH
Acq On : 15 Aug 2011 7:27 am Operator: StephK
Sample : D26397-1, 50X Inst : GC/MS Ins
Misc : GC2136,GGB705,5.007,,100,5,1 Multiplr: 1.00
IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E
Quant Time: Aug 15 7:49 2011 Quant Results File: TB630GB630SOIL.RES

Quant Method : C:\MSDCHEM\1...\TB630GB630SOIL.M (Chemstation Integrator)
Title : 8015B/8021B TVH/BTEX
Last Update : Tue Aug 09 08:19:25 2011
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

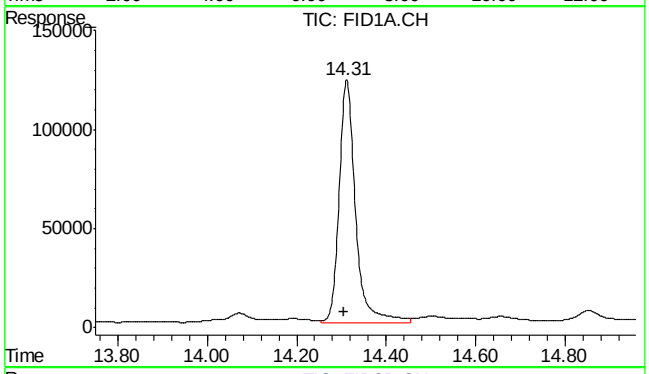




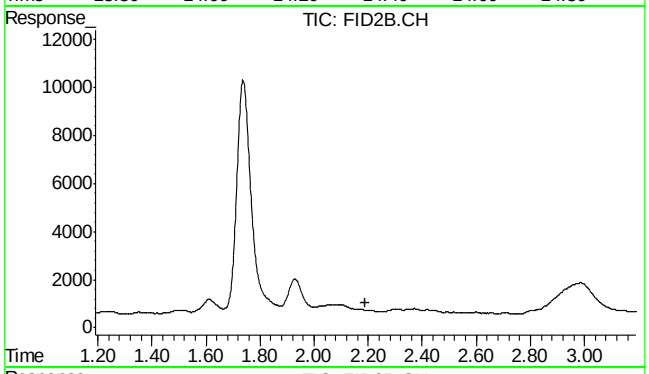

#1 TVH-Gasoline

R.T.: 7.215 min
Delta R.T.: 0.000 min
Response: 3152429
Conc: N.D.



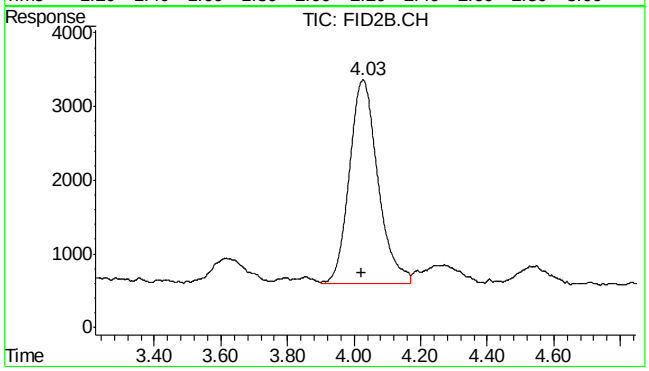

#2 1,2,4-Trichlorobenzene

R.T.: 14.311 min
Delta R.T.: 0.007 min
Response: 3148740
Conc: 81.35 % m




#4 Methyl-t-butyl-ether

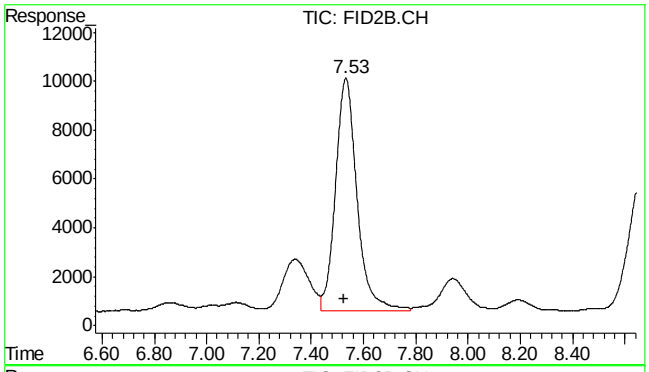
R.T.: 0.000 min
Exp R.T. : 2.190 min
Response: 0
Conc: N.D.




#5 Benzene

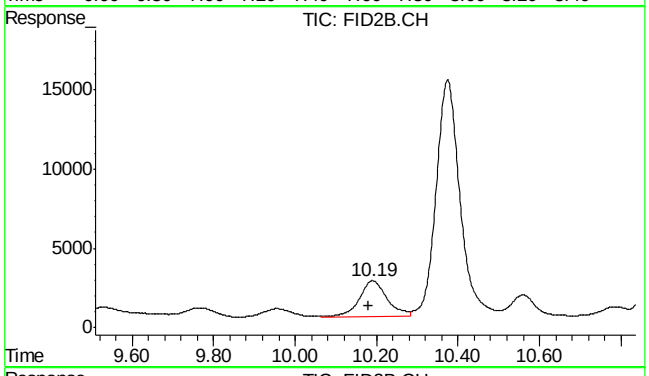
R.T.: 4.027 min
Delta R.T.: 0.002 min
Response: 165618
Conc: 0.24 ug/L

10.1.1 10



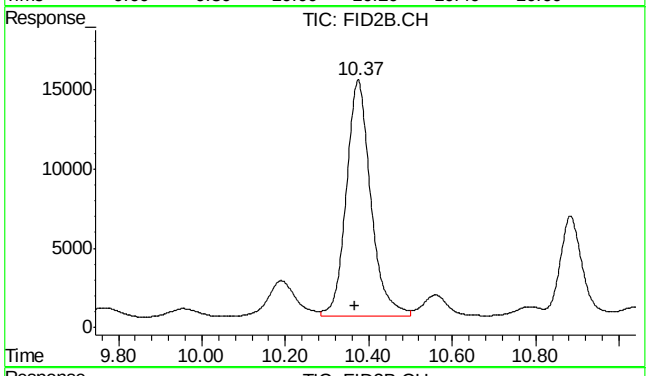

#6 Toluene

R.T.: 7.533 min
Delta R.T.: 0.008 min
Response: 543531
Conc: 0.83 ug/L



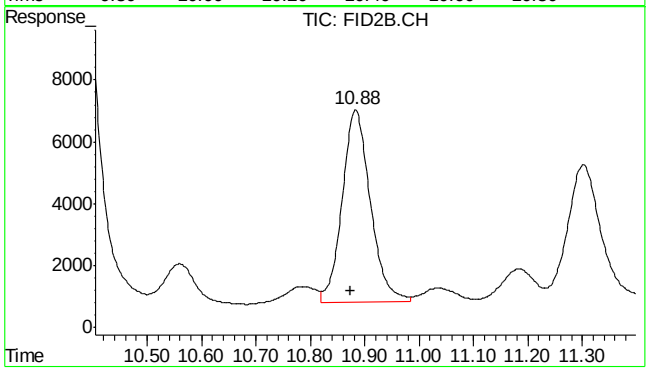

#7 Ethylbenzene

R.T.: 10.191 min
Delta R.T.: 0.010 min
Response: 106880
Conc: 0.19 ug/L



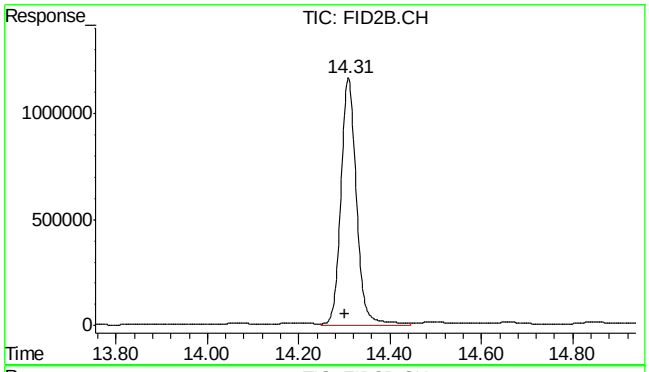

#8 m,p-Xylene

R.T.: 10.375 min
Delta R.T.: 0.008 min
Response: 605971
Conc: 0.89 ug/L



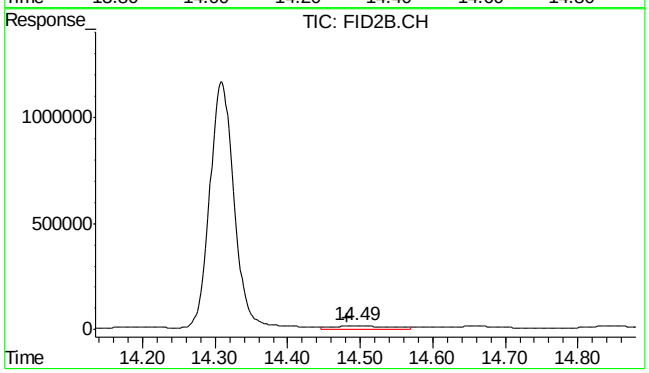

#9 o-Xylene

R.T.: 10.883 min
Delta R.T.: 0.009 min
Response: 224631
Conc: 0.40 ug/L




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

| | |
|---|---|
| R.T.: | 14.309 min |
| Delta R.T.: | 0.009 min |
| Response: | 27577003 |
| Conc: | 81.77 % |




#11 Naphthalene

| | |
|---|---|
| R.T.: | 14.494 min |
| Delta R.T.: | 0.012 min |
| Response: | 789515 |
| Conc: | 2.47 ug/L |

Quantitation Report (QT Reviewed)

Signal #1 : Y:\1\DATA\081411\GB12368.D\FID1A.CH Vial: 3
Signal #2 : Y:\1\DATA\081411\GB12368.D\FID2B.CH
Acq On : 14 Aug 2011 5:43 pm Operator: StephK
Sample : MB, S Inst : GC/MS Ins
Misc : GC2136,GGB705,5.000,,100,5,1 Multiplr: 1.00
IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E
Quant Time: Aug 15 08:37:18 2011 Quant Results File: TB630GB630SOIL.RES

Quant Method : C:\MSDCHEM\1...\TB630GB630SOIL.M (Chemstation Integrator)
Title : 8015B/8021B TVH/BTEX
Last Update : Tue Aug 09 08:19:25 2011
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 | 14.32 | 3431760 | 88.663 | % |
| 10) S | 1,2,4-Trichlorobenzene (P) | 14.32 | 30644296 | 92.035 | % |
| | **Target Compounds** | | | | |
| 1) H | TVH-Gasoline | 7.21 | 2547962 | N.D. | 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 | 7.55 | 220688 | 0.338 | ug/L |
| 7) T | Ethylbenzene | 10.21 | 87893 | 0.153 | ug/L |
| 8) T | m,p-Xylene | 10.39 | 404826 | 0.597 | ug/L |
| 9) T | o-Xylene | 10.90 | 274791 | 0.484 | ug/L |
| 11) T | Naphthalene | 14.50 | 426955 | 1.334 | ug/L |

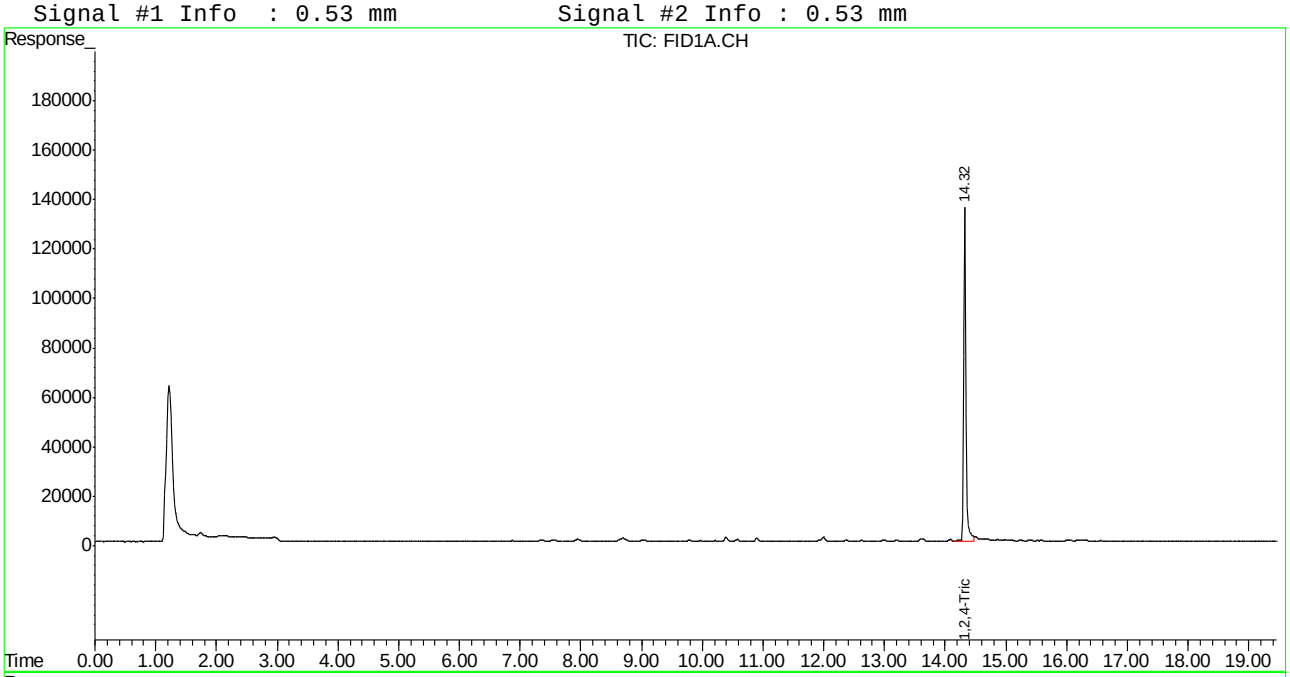
(f)=RT Delta > 1/2 Window (m)=manual int.

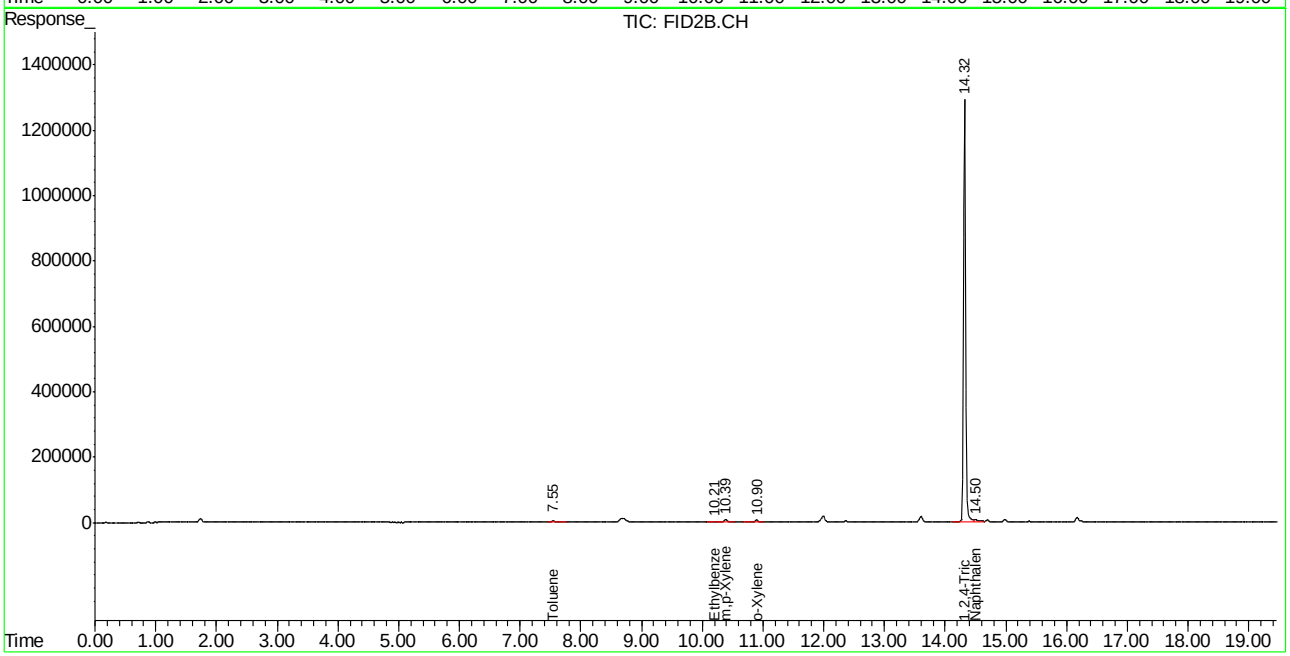
Quantitation Report (QT Reviewed)

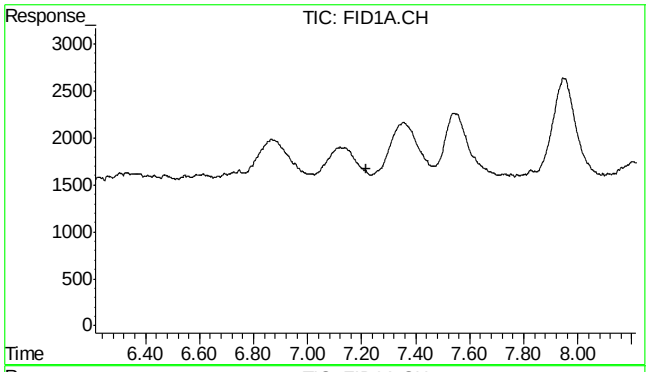
Signal #1 : Y:\1\DATA\081411\GB12368.D\FID1A.CH Vial: 3
Signal #2 : Y:\1\DATA\081411\GB12368.D\FID2B.CH
Acq On : 14 Aug 2011 5:43 pm Operator: StephK
Sample : MB, S Inst : GC/MS Ins
Misc : GC2136,GGB705,5.000,,100,5,1 Multiplr: 1.00
IntFile Signal #1: TVH1.E IntFile Signal #2: FB2.E
Quant Time: Aug 15 7:39 2011 Quant Results File: TB630GB630SOIL.RES

Quant Method : C:\MSDCHEM\1...\TB630GB630SOIL.M (Chemstation Integrator)
Title : 8015B/8021B TVH/BTEX
Last Update : Tue Aug 09 08:19:25 2011
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

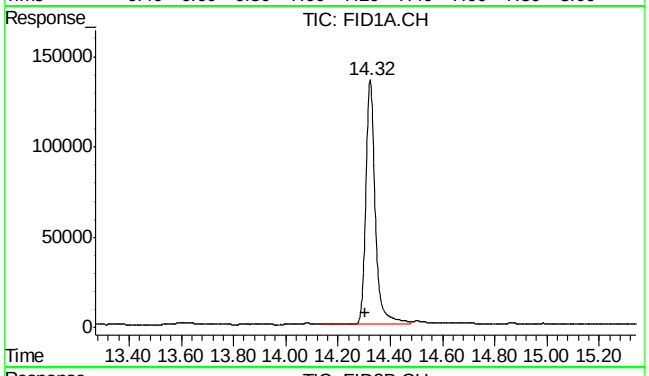




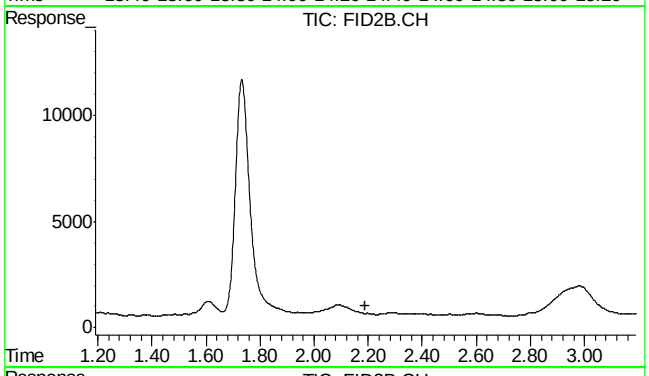

#1 TVH-Gasoline

R.T.: 7.215 min
Delta R.T.: 0.000 min
Response: 2547962
Conc: N.D.



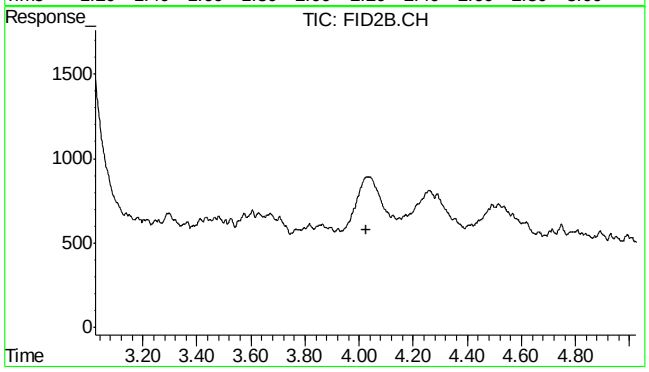

#2 1,2,4-Trichlorobenzene

R.T.: 14.323 min
Delta R.T.: 0.019 min
Response: 3431760
Conc: 88.66 %



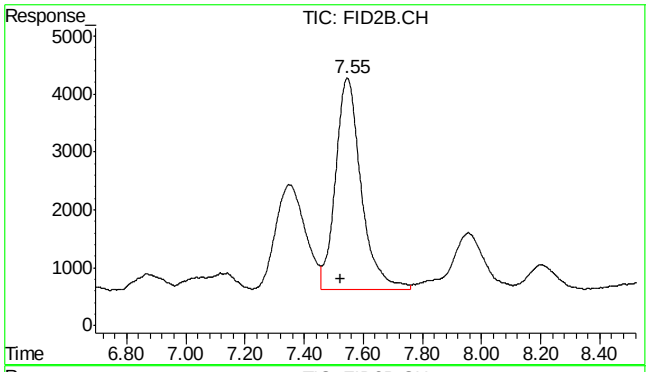

#4 Methyl-t-butyl-ether

R.T.: 0.000 min
Exp R.T. : 2.190 min
Response: 0
Conc: N.D.



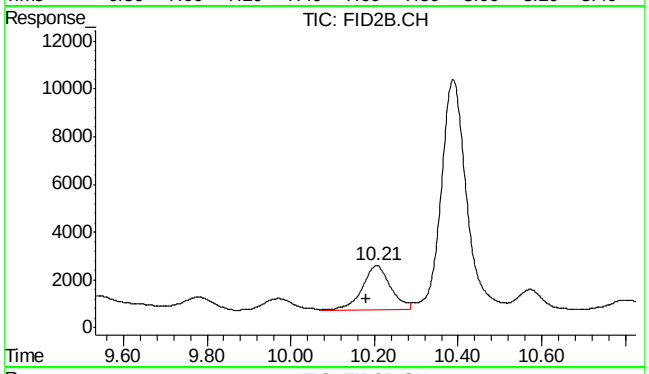

#5 Benzene

R.T.: 0.000 min
Exp R.T. : 4.024 min
Response: 0
Conc: N.D.



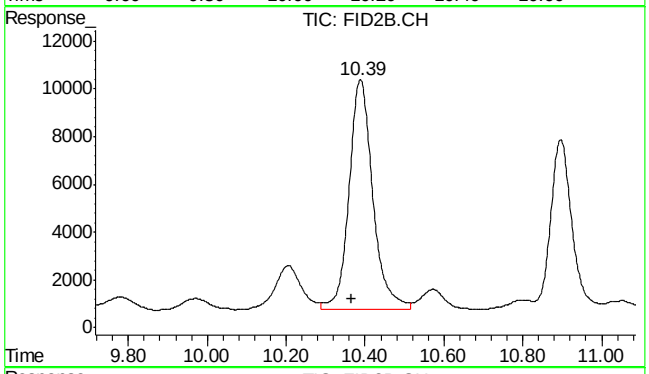

#6 Toluene

R.T.: 7.546 min
Delta R.T.: 0.022 min
Response: 220688
Conc: 0.34 ug/L



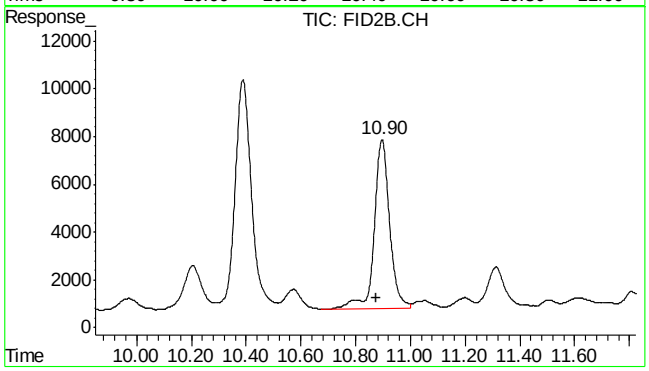

#7 Ethylbenzene

R.T.: 10.206 min
Delta R.T.: 0.025 min
Response: 87893
Conc: 0.15 ug/L



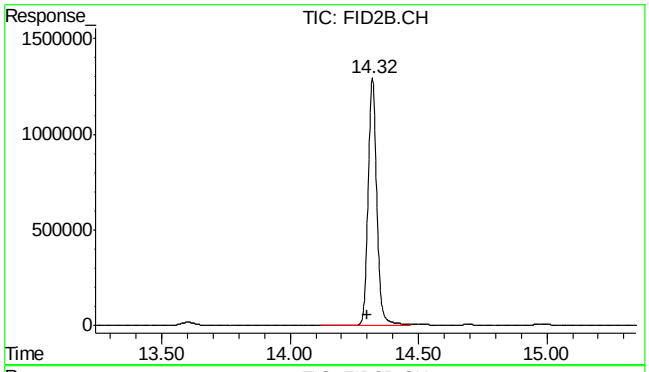

#8 m,p-Xylene

R.T.: 10.388 min
Delta R.T.: 0.022 min
Response: 404826
Conc: 0.60 ug/L



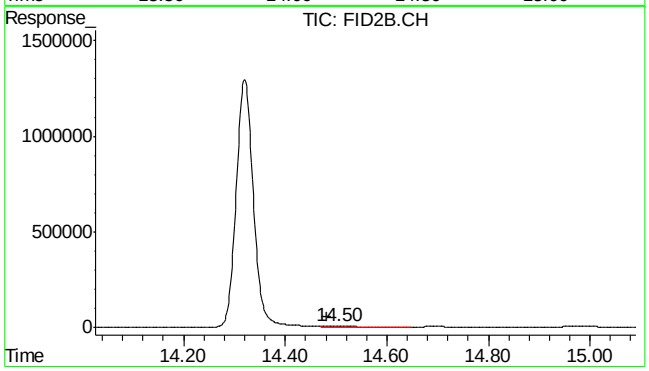

#9 o-Xylene

R.T.: 10.896 min
Delta R.T.: 0.022 min
Response: 274791
Conc: 0.48 ug/L




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

R.T.: 14.320 min
Delta R.T.: 0.020 min
Response: 30644296
Conc: 92.03 %




#11 Naphthalene

R.T.: 14.501 min
Delta R.T.: 0.019 min
Response: 426955
Conc: 1.33 ug/L

Mountain States ACCUTEST LABORATORIES

## 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:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP4230-MB | FD09030.D | 1 | 08/12/11 | CS | 08/12/11 | OP4230 | GFD389 |

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

D26397-1

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | ND | 13 | 8.7 | mg/kg | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 84-15-1 | o-Terphenyl | 106% | 61-142% |

# Blank Spike Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP4230-BS | FD09031.D | 1 | 08/12/11 | CS | 08/12/11 | OP4230 | GFD389 |

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

D26397-1

| CAS No. | Compound | Spike mg/kg | BSP mg/kg | BSP % | Limits |
|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | 667 | 521 | 78 | 60-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 84-15-1 | o-Terphenyl | 88% | 61-142% |

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** D26397
**Account:** KRWCCOL KRW Consulting, Inc.
**Project:** XOM PCU 297-12A

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP4230-MS | FD09032.D | 1 | 08/12/11 | CS | 08/12/11 | OP4230 | GFD389 |
| OP4230-MSD | FD09033.D | 1 | 08/12/11 | CS | 08/12/11 | OP4230 | GFD389 |
| D26429-4 | FD09038.D | 1 | 08/13/11 | CS | 08/11/11 | OP4230 | GFD389 |

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

D26397-1

| CAS No. | Compound | D26429-4 mg/kg | Q | Spike mg/kg | MS mg/kg | MS % | MSD mg/kg | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | 46.3 | | 741 | 538 | 66 | 602 | 75 | 11 | 24-157/35 |

| CAS No. | Surrogate Recoveries | MS | MSD | D26429-4 | Limits |
|---|---|---|---|---|---|
| 84-15-1 | o-Terphenyl | 73% | 80% | 87% | 61-142% |

Mountain States ACCUTEST LABORATORIES

GC Semi-volatiles

Raw Data

Manual Integrations APPROVED (compounds with "m" flag)
Koroush Vaziri 08/15/11 11:16

Quantitation Report (QT Reviewed)

Data File : C:\MSDCHEM\2\DATA\FD081211\FD09047.D Vial: 47
Acq On : 8-13-2011 05:56:14 AM Operator: CHAVALIT
Sample : D26397-1 Inst : FID5
Misc : OP4230,GFD389,30.10,,,2,1 Multiplr: 1.00
IntFile : DF-GFC101.E
Quant Time: Aug 13 13:28:48 2011 Quant Results File: GFD356.RES

Quant Method : C:\MSDCHEM\2\METHODS\GFD356.M (Chemstation Integrator)
Title : 8015B TEH
Last Update : Thu Aug 11 11:51:33 2011
Response via : Initial Calibration
DataAcq Meth : JH080911.M

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

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | |
| 1) | S O-Terphenyl | 9.47 | 37259062 | 814.895 | mg/L | m |
| | Target Compounds | | | | | |
| 2) | H TPH-DRO (c10-c28) | 7.43 | 13491324 | 306.678 | mg/L | |

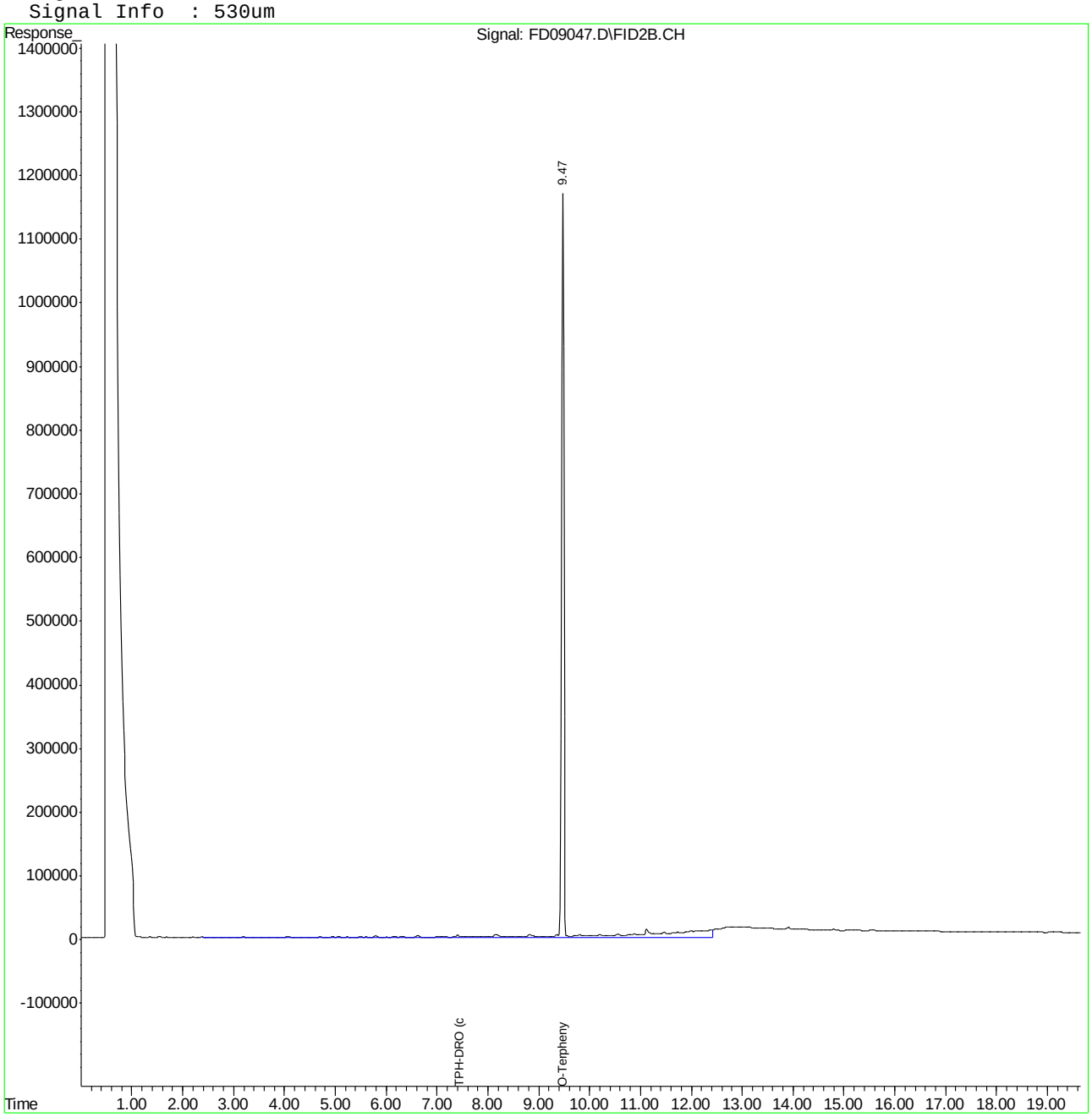
(f)=RT Delta > 1/2 Window (m)=manual int.
FD09047.D GFD356.M Sat Aug 13 13:29:14 2011 GC Page 1

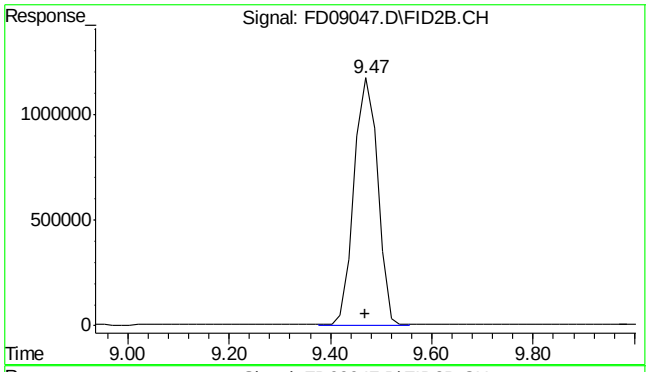
Quantitation Report (QT Reviewed)

Data File : C:\MSDCHEM\2\DATA\FD081211\FD09047.D Vial: 47
Acq On : 8-13-2011 05:56:14 AM Operator: CHAVALIT
Sample : D26397-1 Inst : FID5
Misc : OP4230,GFD389,30.10,,,2,1 Multiplr: 1.00
IntFile : DF-GFC101.E
Quant Time: Aug 13 13:29 2011 Quant Results File: GFD356.RES

Quant Method : C:\MSDCHEM\2\METHODS\GFD356.M (Chemstation Integrator)
Title : 8015B TEH
Last Update : Thu Aug 11 11:51:33 2011
Response via : Multiple Level Calibration
DataAcq Meth : JH080911.M

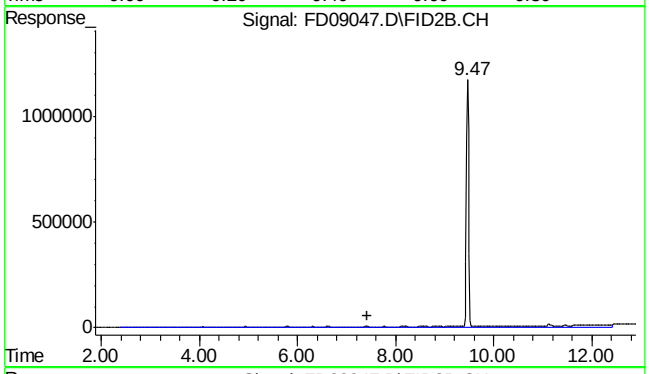
Volume Inj. : 1ul
Signal Phase : RTX-5
Signal Info : 530um





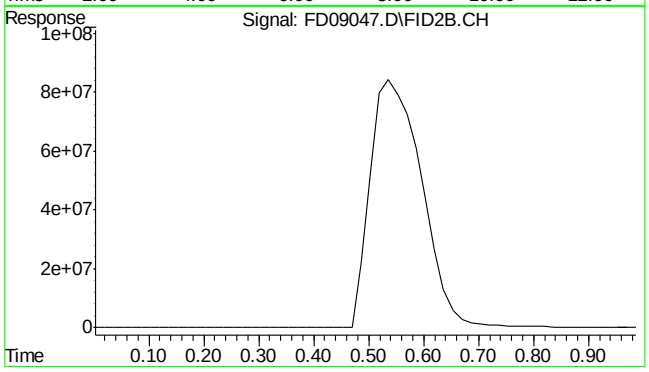

#1 O-Terphenyl

R.T.: 9.470 min
Delta R.T.: 0.002 min
Response: 37259062
Conc: 814.90 mg/L m




#2 TPH-DRO (c10-c28)

R.T.: 7.435 min
Delta R.T.: 0.000 min
Response: 13491324
Conc: 306.68 mg/L m




#9 5a-Androstane

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

Manual Integrations APPROVED (compounds with "m" flag)
Judy Melson 08/14/11 09:39

Quantitation Report (QT Reviewed)

Data File : C:\MSDCHEM\2\DATA\FD081211\FD09030.D Vial: 30
Acq On : 12 Aug 2011 10:43 pm Operator: CHAVALIT
Sample : OP4230-MB Inst : FID5
Misc : OP4230,GFD389,30.00,,,2,1 Multiplr: 1.00
IntFile : DF-GFC101.E
Quant Time: Aug 13 13:19:07 2011 Quant Results File: GFD356.RES

Quant Method : C:\MSDCHEM\2\METHODS\GFD356.M (Chemstation Integrator)
Title : 8015B TEH
Last Update : Thu Aug 11 11:51:33 2011
Response via : Initial Calibration
DataAcq Meth : JH080911.M

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

| | Compound | R.T. | Response | Conc | Units | |
|---|---|---|---|---|---|---|
| | System Monitoring Compounds | | | | | |
| 1) S | O-Terphenyl | 9.47 | 48321153 | 1056.835 | mg/L | m |
| | Target Compounds | | | | | |
| 2) H | TPH-DRO (c10-c28) | 7.43 | 4985671 | 113.332 | mg/L | |

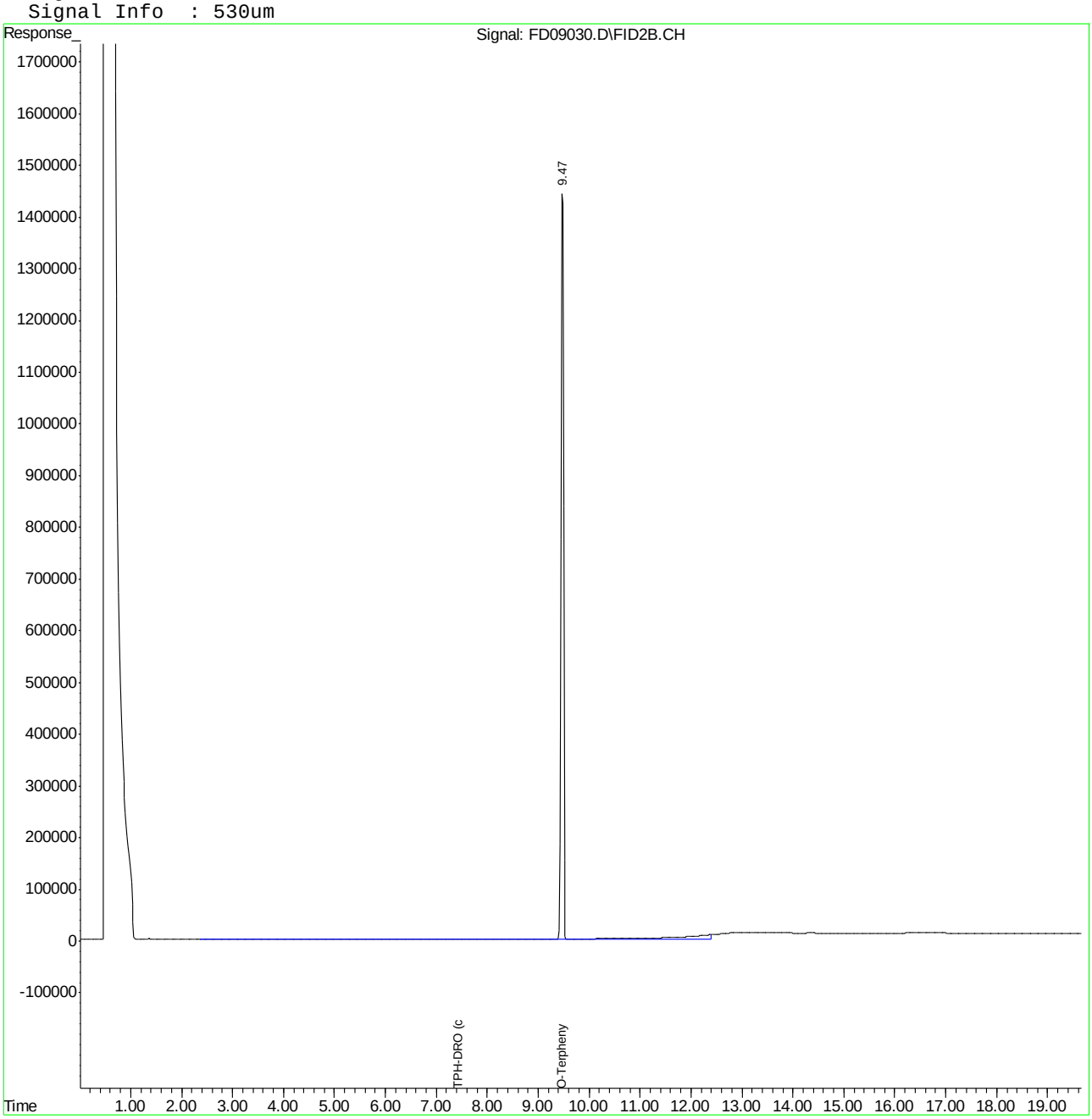
(f)=RT Delta > 1/2 Window (m)=manual int.

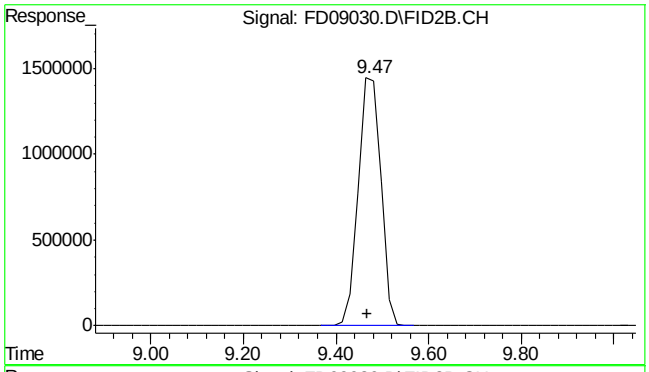
Quantitation Report (QT Reviewed)

Data File : C:\MSDCHEM\2\DATA\FD081211\FD09030.D Vial: 30
Acq On : 12 Aug 2011 10:43 pm Operator: CHAVALIT
Sample : OP4230-MB Inst : FID5
Misc : OP4230,GFD389,30.00,,,2,1 Multiplr: 1.00
IntFile : DF-GFC101.E
Quant Time: Aug 13 13:19 2011 Quant Results File: GFD356.RES

Quant Method : C:\MSDCHEM\2\METHODS\GFD356.M (Chemstation Integrator)
Title : 8015B TEH
Last Update : Thu Aug 11 11:51:33 2011
Response via : Multiple Level Calibration
DataAcq Meth : JH080911.M

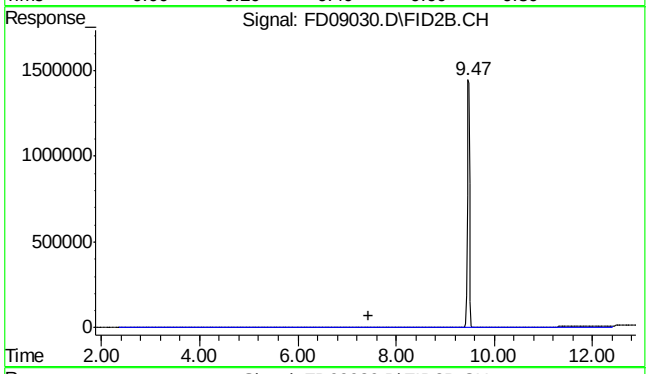
Volume Inj. : 1ul
Signal Phase : RTX-5
Signal Info : 530um





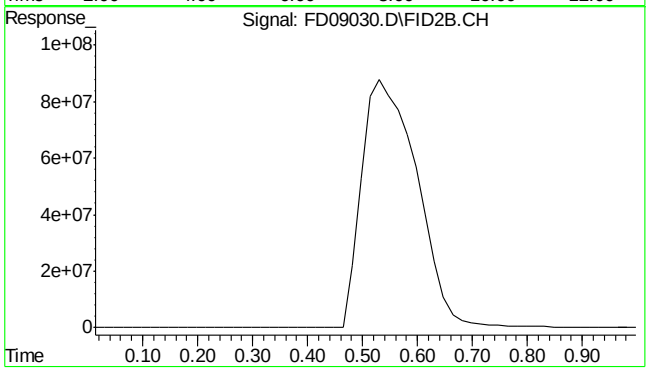

#1 O-Terphenyl

R.T.: 9.472 min
Delta R.T.: 0.004 min
Response: 48321153
Conc: 1056.83 mg/L m




#2 TPH-DRO (c10-c28)

R.T.: 7.435 min
Delta R.T.: 0.000 min
Response: 4985671
Conc: 113.33 mg/L m




#9 5a-Androstane

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

Mountain States ACCUTEST LABORATORIES

## 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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 08/12/11

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|
| Aluminum | 10 | .59 | .59 | | |
| Antimony | 3.0 | .31 | .31 | | |
| Arsenic | 2.5 | .59 | .59 | | |
| Barium | 1.0 | .11 | .11 | 0.070 | <1.0 |
| Beryllium | 1.0 | .044 | .1 | | |
| Boron | 5.0 | .48 | .48 | | |
| Cadmium | 1.0 | .027 | .27 | 0.030 | <1.0 |
| Calcium | 40 | .96 | 1.1 | | |
| Chromium | 1.0 | .018 | .031 | 0.060 | <1.0 |
| Cobalt | 0.50 | .035 | .035 | | |
| Copper | 1.0 | .085 | .16 | -0.040 | <1.0 |
| Iron | 14 | .34 | 2 | | |
| Lead | 5.0 | .16 | .21 | -0.020 | <5.0 |
| Lithium | 0.20 | .028 | .031 | | |
| Magnesium | 20 | .58 | 1.4 | | |
| Manganese | 0.50 | .0053 | .012 | | |
| Molybdenum | 1.0 | .045 | .054 | | |
| Nickel | 3.0 | .043 | .099 | -0.040 | <3.0 |
| Phosphorus | 10 | 1.1 | 1.2 | | |
| Potassium | 200 | 5.5 | 9.2 | | |
| Selenium | 5.0 | .38 | .5 | 0.020 | <5.0 |
| Silicon | 5.0 | .38 | .51 | | |
| Silver | 3.0 | .018 | .051 | -0.010 | <3.0 |
| Sodium | 40 | 11 | 11 | | |
| Strontium | 5.0 | | .017 | | |
| Thallium | 1.0 | .29 | .34 | | |
| Tin | 5.0 | .55 | 1.3 | | |
| Titanium | 1.0 | .011 | .1 | | |
| Uranium | 5.0 | .15 | .2 | | |
| Vanadium | 1.0 | .016 | .025 | | |
| Zinc | 3.0 | .028 | .06 | 0.27 | <3.0 |

Associated samples MP5445: D26397-1

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

| Metal |
|---|

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 08/12/11

| Metal | D26479-1 Original | MS | Spikelot MPICPALL | % Rec | QC Limits |
|---|---|---|---|---|---|
| Aluminum | anr | | | | |
| Antimony | | | | | |
| Arsenic | anr | | | | |
| Barium | 1440 | 1860 | 213 | 196.8(a) | 75-125 |
| Beryllium | | | | | |
| Boron | anr | | | | |
| Cadmium | 0.14 | 47.4 | 53.3 | 88.6 | 75-125 |
| Calcium | | | | | |
| Chromium | 41.7 | 84.5 | 53.3 | 80.2 | 75-125 |
| Cobalt | | | | | |
| Copper | 15.9 | 63.5 | 53.3 | 89.2 | 75-125 |
| Iron | anr | | | | |
| Lead | 12.1 | 100 | 107 | 82.4 | 75-125 |
| Lithium | | | | | |
| Magnesium | | | | | |
| Manganese | | | | | |
| Molybdenum | anr | | | | |
| Nickel | 20.7 | 62.0 | 53.3 | 77.4 | 75-125 |
| Phosphorus | | | | | |
| Potassium | anr | | | | |
| Selenium | 1.9 | 91.4 | 107 | 83.9 | 75-125 |
| Silicon | | | | | |
| Silver | 0.17 | 19.7 | 21.3 | 91.5 | 75-125 |
| Sodium | | | | | |
| Strontium | | | | | |
| Thallium | | | | | |
| Tin | | | | | |
| Titanium | | | | | |
| Uranium | | | | | |
| Vanadium | | | | | |
| Zinc | 45.5 | 85.7 | 53.3 | 75.4 | 75-125 |

Associated samples MP5445: D26397-1

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445 Methods: SW846 6010B
Matrix Type: SOLID Units: mg/kg

Prep Date: 08/12/11

| Metal | D26479-1 Original | MSD | Spikelot MPICPALL | % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|---|---|
| Aluminum | anr | | | | | |
| Antimony | | | | | | |
| Arsenic | anr | | | | | |
| Barium | 1440 | 1760 | 205 | 155.9(a) | 5.5 | 20 |
| Beryllium | | | | | | |
| Boron | anr | | | | | |
| Cadmium | 0.14 | 45.9 | 51.3 | 89.2 | 3.2 | 20 |
| Calcium | | | | | | |
| Chromium | 41.7 | 85.1 | 51.3 | 84.6 | 0.7 | 20 |
| Cobalt | | | | | | |
| Copper | 15.9 | 61.5 | 51.3 | 88.9 | 3.2 | 20 |
| Iron | anr | | | | | |
| Lead | 12.1 | 97.0 | 103 | 82.7 | 3.0 | 20 |
| Lithium | | | | | | |
| Magnesium | | | | | | |
| Manganese | | | | | | |
| Molybdenum | anr | | | | | |
| Nickel | 20.7 | 59.8 | 51.3 | 76.2 | 3.6 | 20 |
| Phosphorus | | | | | | |
| Potassium | anr | | | | | |
| Selenium | 1.9 | 88.7 | 103 | 84.6 | 3.0 | 20 |
| Silicon | | | | | | |
| Silver | 0.17 | 19.0 | 20.5 | 91.7 | 3.6 | 20 |
| Sodium | | | | | | |
| Strontium | | | | | | |
| Thallium | | | | | | |
| Tin | | | | | | |
| Titanium | | | | | | |
| Uranium | | | | | | |
| Vanadium | | | | | | |
| Zinc | 45.5 | 87.4 | 51.3 | 81.7 | 2.0 | 20 |

Associated samples MP5445: D26397-1

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
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.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 08/12/11

| Metal | BSP Result | Spikelot MPICPALL | % Rec | QC Limits |
|---|---|---|---|---|
| Aluminum | anr | | | |
| Antimony | | | | |
| Arsenic | anr | | | |
| Barium | 190 | 200 | 95.0 | 80-120 |
| Beryllium | | | | |
| Boron | anr | | | |
| Cadmium | 48.5 | 50 | 97.0 | 80-120 |
| Calcium | | | | |
| Chromium | 48.5 | 50 | 97.0 | 80-120 |
| Cobalt | | | | |
| Copper | 48.0 | 50 | 96.0 | 80-120 |
| Iron | anr | | | |
| Lead | 96.5 | 100 | 96.5 | 80-120 |
| Lithium | | | | |
| Magnesium | | | | |
| Manganese | | | | |
| Molybdenum | anr | | | |
| Nickel | 46.8 | 50 | 93.6 | 80-120 |
| Phosphorus | | | | |
| Potassium | anr | | | |
| Selenium | 93.3 | 100 | 93.3 | 80-120 |
| Silicon | | | | |
| Silver | 20.2 | 20 | 101.0 | 80-120 |
| Sodium | | | | |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Uranium | | | | |
| Vanadium | | | | |
| Zinc | 47.4 | 50 | 94.8 | 80-120 |

Associated samples MP5445: D26397-1

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

| Metal |
|---|

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 08/12/11

| Metal | D26479-1 Original | SDL 1:5 | %DIF | QC Limits |
|---|---|---|---|---|
| Aluminum | anr | | | |
| Antimony | | | | |
| Arsenic | anr | | | |
| Barium | 14300 | 17000 | 19.1*(a) | 0-10 |
| Beryllium | | | | |
| Boron | anr | | | |
| Cadmium | 1.40 | 0.00 | 100.0(b) | 0-10 |
| Calcium | | | | |
| Chromium | 414 | 495 | 19.6*(a) | 0-10 |
| Cobalt | | | | |
| Copper | 158 | 166 | 5.1 | 0-10 |
| Iron | anr | | | |
| Lead | 120 | 133 | 10.7*(a) | 0-10 |
| Lithium | | | | |
| Magnesium | | | | |
| Manganese | | | | |
| Molybdenum | anr | | | |
| Nickel | 206 | 253 | 23.1*(a) | 0-10 |
| Phosphorus | | | | |
| Potassium | anr | | | |
| Selenium | 18.5 | 0.00 | 100.0(b) | 0-10 |
| Silicon | | | | |
| Silver | 1.70 | 5.50 | 223.5(b) | 0-10 |
| Sodium | | | | |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Uranium | | | | |
| Vanadium | | | | |
| Zinc | 452 | 577 | 27.5*(a) | 0-10 |

Associated samples MP5445: D26397-1

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5445
Matrix Type: SOLID

Methods: SW846 6010B
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).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5446
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 08/12/11

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|
| Aluminum | 25 | .14 | 1.2 | | |
| Antimony | 0.20 | .001 | .0095 | | |
| Arsenic | 0.40 | .049 | .22 | 0.067 | <0.40 |
| Barium | 1.0 | .0035 | .1 | | |
| Beryllium | 0.10 | .0075 | .014 | | |
| Boron | 20 | .97 | 1 | | |
| Cadmium | 0.050 | .023 | .048 | | |
| Calcium | 200 | 1.8 | 8.2 | | |
| Chromium | 1.0 | .021 | .24 | | |
| Cobalt | 0.10 | .0033 | .003 | | |
| Copper | 1.0 | .011 | .063 | | |
| Iron | 20 | .81 | 3.7 | | |
| Lead | 0.25 | .0012 | .015 | | |
| Magnesium | 50 | .067 | 2.6 | | |
| Manganese | 0.50 | .007 | .029 | | |
| Molybdenum | 0.50 | .0044 | .023 | | |
| Nickel | 1.0 | .0029 | .031 | | |
| Phosphorus | 30 | 1.8 | 3.5 | | |
| Potassium | 100 | 2 | 3.2 | | |
| Selenium | 0.20 | .075 | .19 | | |
| Silver | 0.050 | .0008 | .002 | | |
| Sodium | 250 | .8 | 4.4 | | |
| Strontium | 10 | .004 | .04 | | |
| Thallium | 0.10 | .015 | .02 | | |
| Tin | 5.0 | .006 | .028 | | |
| Titanium | 1.0 | .035 | .062 | | |
| Uranium | 0.25 | .00038 | .0009 | | |
| Vanadium | 2.0 | .052 | .29 | | |
| Zinc | 5.0 | .039 | .12 | | |

Associated samples MP5446: D26397-1

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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5446
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 08/12/11

| Metal | D26479-1 Original | MS | Spikelot MPICPALL | % Rec | QC Limits |
|---|---|---|---|---|---|
| Aluminum | | | | | |
| Antimony | | | | | |
| Arsenic | 2.7 | 108 | 107 | 98.7 | 60-119 |
| Barium | anr | | | | |
| Beryllium | | | | | |
| Boron | | | | | |
| Cadmium | anr | | | | |
| Calcium | | | | | |
| Chromium | anr | | | | |
| Cobalt | | | | | |
| Copper | | | | | |
| Iron | | | | | |
| Lead | anr | | | | |
| Magnesium | | | | | |
| Manganese | | | | | |
| Molybdenum | | | | | |
| Nickel | | | | | |
| Phosphorus | | | | | |
| Potassium | | | | | |
| Selenium | anr | | | | |
| Silver | anr | | | | |
| Sodium | | | | | |
| Strontium | | | | | |
| Thallium | | | | | |
| Tin | | | | | |
| Titanium | | | | | |
| Uranium | | | | | |
| Vanadium | | | | | |
| Zinc | | | | | |

Associated samples MP5446: D26397-1

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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5446 Methods: SW846 6020
Matrix Type: SOLID Units: mg/kg

Prep Date: 08/12/11

| Metal | D26479-1 Original | MSD | Spikelot MPICPALL | % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|---|---|
| Aluminum | | | | | | |
| Antimony | | | | | | |
| Arsenic | 2.7 | 97.4 | 103 | 92.3 | 10.3 | 20 |
| Barium | anr | | | | | |
| Beryllium | | | | | | |
| Boron | | | | | | |
| Cadmium | anr | | | | | |
| Calcium | | | | | | |
| Chromium | anr | | | | | |
| Cobalt | | | | | | |
| Copper | | | | | | |
| Iron | | | | | | |
| Lead | anr | | | | | |
| Magnesium | | | | | | |
| Manganese | | | | | | |
| Molybdenum | | | | | | |
| Nickel | | | | | | |
| Phosphorus | | | | | | |
| Potassium | | | | | | |
| Selenium | anr | | | | | |
| Silver | anr | | | | | |
| Sodium | | | | | | |
| Strontium | | | | | | |
| Thallium | | | | | | |
| Tin | | | | | | |
| Titanium | | | | | | |
| Uranium | | | | | | |
| Vanadium | | | | | | |
| Zinc | | | | | | |

Associated samples MP5446: D26397-1

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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5446
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 08/12/11

| Metal | BSP Result | Spikelot MPICPALL | % Rec | QC Limits |
|---|---|---|---|---|
| Aluminum | | | | |
| Antimony | | | | |
| Arsenic | 106 | 100 | 106.0 | 80-120 |
| Barium | anr | | | |
| Beryllium | | | | |
| Boron | | | | |
| Cadmium | anr | | | |
| Calcium | | | | |
| Chromium | anr | | | |
| Cobalt | | | | |
| Copper | | | | |
| Iron | | | | |
| Lead | anr | | | |
| Magnesium | | | | |
| Manganese | | | | |
| Molybdenum | | | | |
| Nickel | | | | |
| Phosphorus | | | | |
| Potassium | | | | |
| Selenium | anr | | | |
| Silver | anr | | | |
| Sodium | | | | |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Uranium | | | | |
| Vanadium | | | | |
| Zinc | | | | |

Associated samples MP5446: D26397-1

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5446
Matrix Type: SOLID

Methods: SW846 6020
Units: ug/l

Prep Date: 08/12/11

| Metal | D26479-1 Original | SDL 5:25 | %DIF | QC Limits |
|---|---|---|---|---|
| Aluminum | | | | |
| Antimony | | | | |
| Arsenic | 27.0 | 31.2 | 15.5*(a) | 0-10 |
| Barium | anr | | | |
| Beryllium | | | | |
| Boron | | | | |
| Cadmium | anr | | | |
| Calcium | | | | |
| Chromium | anr | | | |
| Cobalt | | | | |
| Copper | | | | |
| Iron | | | | |
| Lead | anr | | | |
| Magnesium | | | | |
| Manganese | | | | |
| Molybdenum | | | | |
| Nickel | | | | |
| Phosphorus | | | | |
| Potassium | | | | |
| Selenium | anr | | | |
| Silver | anr | | | |
| Sodium | | | | |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Uranium | | | | |
| Vanadium | | | | |
| Zinc | | | | |

Associated samples MP5446: D26397-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

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

Prep Date: 08/17/11

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|
| Aluminum | 500 | 30 | 30 | | |
| Antimony | 150 | 16 | 16 | | |
| Arsenic | 130 | 30 | 30 | | |
| Barium | 50 | 5.5 | 5.5 | | |
| Beryllium | 50 | 2.2 | 2.5 | | |
| Boron | 250 | 24 | 24 | | |
| Cadmium | 50 | 1.4 | 1.4 | | |
| Calcium | 2000 | 48 | 75 | -11 | <2000 |
| Chromium | 50 | .9 | 4 | | |
| Cobalt | 25 | 1.8 | 1.8 | | |
| Copper | 50 | 4.3 | 14 | | |
| Iron | 350 | 17 | 65 | | |
| Lead | 250 | 8 | 11 | | |
| Lithium | 10 | 1.4 | 6 | | |
| Magnesium | 1000 | 29 | 50 | 42.5 | <1000 |
| Manganese | 25 | .27 | 1.6 | | |
| Molybdenum | 50 | 2.3 | 4.4 | | |
| Nickel | 150 | 2.2 | 5 | | |
| Phosphorus | 500 | 55 | 100 | | |
| Potassium | 5000 | 280 | 280 | | |
| Selenium | 250 | 19 | 19 | | |
| Silicon | 250 | 19 | 19 | | |
| Silver | 150 | .9 | 1.6 | | |
| Sodium | 2000 | 570 | 570 | -320 | <2000 |
| Strontium | 25 | | 1.3 | | |
| Thallium | 50 | 15 | 15 | | |
| Tin | 250 | 28 | 50 | | |
| Titanium | 50 | .55 | 1.6 | | |
| Uranium | 250 | 7.5 | 18 | | |
| Vanadium | 50 | .8 | 1.1 | | |
| Zinc | 150 | 1.4 | 9 | | |

Associated samples MP5487: D26397-1A

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

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

Prep Date:

| Metal |
|---|

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

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

Prep Date: 08/17/11

| Metal | D26396-1A Original MS | | Spikelot MPICPALL | % Rec | QC Limits |
|---|---|---|---|---|---|
| Aluminum | | | | | |
| Antimony | | | | | |
| Arsenic | | | | | |
| Barium | | | | | |
| Beryllium | | | | | |
| Boron | | | | | |
| Cadmium | | | | | |
| Calcium | 7900 | 151000 | 125000 | 114.5 | 75-125 |
| Chromium | | | | | |
| Cobalt | | | | | |
| Copper | | | | | |
| Iron | | | | | |
| Lead | | | | | |
| Lithium | | | | | |
| Magnesium | 617 | 128000 | 125000 | 101.9 | 75-125 |
| Manganese | | | | | |
| Molybdenum | | | | | |
| Nickel | | | | | |
| Phosphorus | | | | | |
| Potassium | | | | | |
| Selenium | | | | | |
| Silicon | | | | | |
| Silver | | | | | |
| Sodium | 469000 | 580000 | 125000 | 88.8 | 75-125 |
| Strontium | | | | | |
| Thallium | | | | | |
| Tin | | | | | |
| Titanium | | | | | |
| Uranium | | | | | |
| Vanadium | | | | | |
| Zinc | | | | | |

Associated samples MP5487: D26397-1A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

Methods: SW846 6010B, 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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

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

Prep Date: 08/17/11

| Metal | D26396-1A Original | MSD | Spikelot MPICPALL | % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|---|---|
| Aluminum | | | | | | |
| Antimony | | | | | | |
| Arsenic | | | | | | |
| Barium | | | | | | |
| Beryllium | | | | | | |
| Boron | | | | | | |
| Cadmium | | | | | | |
| Calcium | 7900 | 149000 | 125000 | 112.9 | 1.3 | 20 |
| Chromium | | | | | | |
| Cobalt | | | | | | |
| Copper | | | | | | |
| Iron | | | | | | |
| Lead | | | | | | |
| Lithium | | | | | | |
| Magnesium | 617 | 127000 | 125000 | 101.1 | 0.8 | 20 |
| Manganese | | | | | | |
| Molybdenum | | | | | | |
| Nickel | | | | | | |
| Phosphorus | | | | | | |
| Potassium | | | | | | |
| Selenium | | | | | | |
| Silicon | | | | | | |
| Silver | | | | | | |
| Sodium | 469000 | 562000 | 125000 | 74.4N(a) | 3.2 | 20 |
| Strontium | | | | | | |
| Thallium | | | | | | |
| Tin | | | | | | |
| Titanium | | | | | | |
| Uranium | | | | | | |
| Vanadium | | | | | | |
| Zinc | | | | | | |

Associated samples MP5487: D26397-1A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

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

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

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

Prep Date: 08/17/11

| Metal | BSP Result | Spikelot MPICPALL | % Rec | QC Limits |
|---|---|---|---|---|
| Aluminum | | | | |
| Antimony | | | | |
| Arsenic | | | | |
| Barium | | | | |
| Beryllium | | | | |
| Boron | | | | |
| Cadmium | | | | |
| Calcium | 145000 | 125000 | 116.0 | 80-120 |
| Chromium | | | | |
| Cobalt | | | | |
| Copper | | | | |
| Iron | | | | |
| Lead | | | | |
| Lithium | | | | |
| Magnesium | 127000 | 125000 | 101.6 | 80-120 |
| Manganese | | | | |
| Molybdenum | | | | |
| Nickel | | | | |
| Phosphorus | | | | |
| Potassium | | | | |
| Selenium | | | | |
| Silicon | | | | |
| Silver | | | | |
| Sodium | 124000 | 125000 | 99.2 | 80-120 |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Uranium | | | | |
| Vanadium | | | | |
| Zinc | | | | |

Associated samples MP5487: D26397-1A

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5487
Matrix Type: AQUEOUS

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

Prep Date:

| Metal |
|---|

(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5540 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 08/23/11

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|
| Mercury | 0.10 | .0011 | .013 | -0.0020 | <0.10 |

Associated samples MP5540: D26397-1

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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5540
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 08/23/11

| Metal | D26397-1 Original | MS | Spikelot HGWSR1 | % Rec | QC Limits |
|---|---|---|---|---|---|
| Mercury | 0.0062 | 0.47 | 0.463 | 100.2 | 85-115 |

Associated samples MP5540: D26397-1

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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5540 Methods: SW846 7471A
Matrix Type: SOLID Units: mg/kg

Prep Date: 08/23/11

| Metal | D26397-1 Original | MSD | Spikelot HGWSR1 | % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|---|---|
| Mercury | 0.0062 | 0.46 | 0.454 | 100.0 | 2.2 | 20 |

Associated samples MP5540: D26397-1

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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

QC Batch ID: MP5540
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 08/23/11

| Metal | BSP Result | Spikelot HGWSR1 | % Rec | QC Limits |
|---|---|---|---|---|
| Mercury | 0.41 | 0.4 | 102.5 | 80-120 |

Associated samples MP5540: D26397-1

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

Mountain States ACCUTEST LABORATORIES

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: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

| Analyte | Batch ID | RL | MB Result | Units | Spike Amount | BSP Result | BSP %Recov | QC Limits |
|---|---|---|---|---|---|---|---|---|
| Specific Conductivity | GP5232/GN11123 | | | umhos/cm | 9986 | 9930 | 99.4 | 90-110% |
| pH | GN11015 | | | su | 8.00 | 7.97 | 99.6 | 99.3-100.7% |

Associated Samples:
Batch GN11015: D26397-1
Batch GP5232: D26397-1
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26397
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM PCU 297-12A

| Analyte | Batch ID | QC Sample | Units | Original Result | DUP Result | RPD | QC Limits |
|---|---|---|---|---|---|---|---|
| Redox Potential Vs H2 | GN11018 | D26479-1 | mv | 414 | 412 | 0.5 | 0-20% |

Associated Samples:
Batch GN11018: D26397-1
(*) Outside of QC limits

Mountain States ACCUTEST LABORATORIES

## Misc. Forms

### Custody Documents and Other Forms

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Chain of Custody

# CHAIN OF CUSTODY

ACCUTEST

4036 Youngfield St., Wheat Ridge, CO 80033
303-425-6021 FAX: 303-425-6854

| | |
|---|---|
| Accutest Job #: | D26397 |
| Accutest Quote #: | 0 |
| AMS P.O. #: | |
| Project No.: | |

| Client Information | | | Subcontract Laboratory Information | | | Analytical Information |
|---|---|---|---|---|---|---|
| Name: Accutest Mountain States (AMS) | | | Name: Accutest - New England | | | |
| Address: 4036 Youngfield St. | | | Address: 495 Technology Center West, BLDG C | | | |
| City: Wheat Ridge, | State: CO | Zip: 80033 | City: Marlborough | State: MA | Zip: 01752 | |
| Send Report to: Tiffany Pham | | | Contact: Sample Management | | | |
| Any questions contact: Shea Greiner | | | | | | |
| Phone/Fax #: (303) 425-6021; (303)425-6854 | | | Phone: (508) 481-6200 | | | |

| Field ID / Point of Collection | Collection Date | Collection Time | | Matrix | # of bottles | Preservation HCL | NaOH | HNO3 | H2SO4 | None | XCRA | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D26397 -1 | 8/9/11 | 2:30 PM | | Soil | 1 | | | | | | X | | | | | |
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Turnaround Information

[X] 10 Business Day Standard — Approved By:
[ ] Other _____ (Days)

10 Day Turnaround Hardcopy, RUSH is FAX Data unless previously approved.

Data Deliverable Information

[ ] Commercial "A"
[ ] Commercial "B"
[ ] Commercial "BN"
[ ] Reduced Tier 1
[ ] Full Tier 1
[ ] PDF
[ ] Compact Disk Deliverable
[ ] Electronic Delivery:
[ ] State Forms
[ ] Other (Specify)

Comments / Remarks

**Please use Colorado regulations and RLs.**

12F

Sample Custody must be documented below each time samples change possession, including courier delivery.

| Relinquished by: | Date & Time: | Received By: | Date & Time: |
|---|---|---|---|
| 1 TRIP | 8/12/11 | 1 | 1 |
| 2 FED | 8-13-11 1046 | 2 | 2 |
| 3 | | 3 | 3 |

For Subcontract Laborartory Use Only

Seal #: Headspace: Yes [ ] No [ ] NA [ ]
Preserved where applicable: [ ]
Temperature °C 2.2 On Ice [X]

15.1 15

**D26397: Chain of Custody**
**Page 1 of 1**
**Accutest Labs of New England, Inc.**

Mountain States ACCUTEST LABORATORIES

## General Chemistry

# QC Data Summaries

(Accutest Labs of New England, Inc.)

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: D26397
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM PCU 297-12A

| Analyte | Batch ID | RL | MB Result | Units | Spike Amount | BSP Result | BSP %Recov | QC Limits |
|---|---|---|---|---|---|---|---|---|
| Chromium, Hexavalent | GP13366/GN35813 | 0.40 | 0.0 | mg/kg | 40 | 44.6 | 111.5 | 80-120% |
| Chromium, Hexavalent | GP13366/GN35813 | | | mg/kg | 741 | 883 | 119.2 | 80-120% |

Associated Samples:
Batch GP13366: D26397-1
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26397
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM PCU 297-12A

| Analyte | Batch ID | QC Sample | Units | Original Result | DUP Result | RPD | QC Limits |
|---|---|---|---|---|---|---|---|
| Chromium, Hexavalent | GP13366/GN35813 | D26246-1 | mg/kg | 0.0 | 0.0 | 0.0 | 0-20% |

Associated Samples:
Batch GP13366: D26397-1
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26397
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM PCU 297-12A

| Analyte | Batch ID | QC Sample | Units | Original Result | Spike Amount | MS Result | %Rec | QC Limits |
|---|---|---|---|---|---|---|---|---|
| Chromium, Hexavalent | GP13366/GN35813 | D26246-1 | mg/kg | 0.0 | 40.9 | 47.3 | 115.7 | 75-125% |
| Chromium, Hexavalent | GP13366/GN35813 | D26246-1 | mg/kg | 0.0 | 962 | 1180 | 122.7 | 75-125% |

Associated Samples:
Batch GP13366: D26397-1
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits