



09/26/11

Technical Report for

KRW Consulting, Inc.

XOM FRU 297-28C

1108-08A

Accutest Job Number: D27858

Sampling Date: 09/20/11

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: 74



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

A handwritten signature in black ink, appearing to read 'John Hamilton'.

John Hamilton
Laboratory Director

Client Service contact: 303-425-6021

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

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Test results relate only to samples analyzed.

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Sample Summary

KRW Consulting, Inc.

Job No: D27858

XOM FRU 297-28C
Project No: 1108-08A

Sample Number	Collected		Time By	Received	Matrix		Client Sample ID
	Date				Code	Type	
D27858-1	09/20/11	14:35	CB	09/21/11	SO	Sludge	FRESH WATER CONTENTS
D27858-1A	09/20/11	14:35	CB	09/21/11	SO	Sludge	FRESH WATER CONTENTS

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

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: KRW Consulting, Inc.

Job No D27858

Site: XOM FRU 297-28C

Report Dat 9/26/2011 3:38:40 PM

On 09/21/2011, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 2.9 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D27858 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: V5V1048
------------------	--------------------------

- All samples were analyzed within the recommended method holding time.
- Sample(s) D27929-1MS, D27929-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Extractables by GCMS By Method SW846 8270C BY SIM

Matrix SO	Batch ID: OP4520
------------------	-------------------------

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D27856-1MS, D27856-1MSD 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 Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene are outside control limits. Outside control limits due to matrix interference. Refer to Blank Spike.
- The RPD(s) for the MS and MSD recoveries of Benzo(b)fluoranthene are outside control limits for sample OP4520-MSD. Variability of recovery may be due to sample matrix/homogeneity.
- Sample(s) D27858-1 have surrogates outside control limits. Probable cause due to matrix interference.

Volatiles by GC By Method SW846 8015B

Matrix SO	Batch ID: GGB747
------------------	-------------------------

- All samples were analyzed within the recommended method holding time.
- Sample(s) D27795-1MS, D27795-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Extractables by GC By Method SW846-8015B

Matrix SO	Batch ID: OP4519
------------------	-------------------------

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D27796-8MS, D27796-8MSD 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: MP5836

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D27856-1AMS, D27856-1AMSD were used as the QC samples for the metals analysis.

Matrix SO

Batch ID: MP5834

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D27856-1MS, D27856-1MSD, D27856-1SDL were used as the QC samples for the metals analysis.
- The matrix spike (MS) and matrix spike duplicate (MSD) recovery(s) of Chromium, Nickel, Zinc are outside control limits. Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
- 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 are outside control limits for sample MP5834-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- D27858-1 for Selenium: Elevated detection limit due to dilution required for possible matrix interference.
- The serial dilution RPD(s) for Barium, Chromium, Nickel, Zinc are outside control limits for sample MP5834-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 6020

Matrix SO

Batch ID: MP5835

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D27856-1MS, D27856-1MSD, D27856-1SDL were used as the QC samples for the metals analysis.

Metals By Method SW846 7471A

Matrix SO

Batch ID: MP5837

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D27740-1MS, D27740-1MSD were used as the QC samples for the metals analysis.

Wet Chemistry By Method ASTM D1498-76M

Matrix SO

Batch ID: GN11680

- Sample(s) D27858-1DUP were used as the QC samples for the Redox Potential Vs H2 analysis.

Wet Chemistry By Method DEPT.OF AG, BOOK N9

Matrix SO

Batch ID: GP5539

- All samples were prepared and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

Wet Chemistry By Method SM19 2540B M

Matrix SO

Batch ID: GN11671

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

Wet Chemistry By Method SW846 3060/7196A M

Matrix SO

Batch ID: R9862

- The data for SW846 3060/7196A M meets quality control requirements.
- D27858-1 for Chromium, Trivalent: Calculated as: (Chromium) - (Chromium, Hexavalent)

Wet Chemistry By Method SW846 3060A/7196A

Matrix SO

Batch ID: M:GP13552

- The data for SW846 3060A/7196A meets quality control requirements.
- D27858-1 for Chromium, Hexavalent: Analysis performed at Accutest Laboratories, Marlborough, MA.

Wet Chemistry By Method USDA HANDBOOK 60

Matrix SO

Batch ID: MP5836

- D27858-1A for Sodium Adsorption Ratio: Calculated as: $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

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

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

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

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: Accutest Mountain States

Job No D27858

Site: KRWCCOL: XOM FRU 297-28C

Report Date 9/26/2011 3:57:23 PM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 09/20/2011 and were received at Accutest on 09/21/2011 properly preserved, at XXXXNO TEMPERATURE FOUNDXXXX Deg. C and intact. These Samples received an Accutest job number of D27858. 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: GP13552

- 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) D27856-1DUP, D27856-1MS 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(D27858).

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	FRESH WATER CONTENTS			Date Sampled:	09/20/11
Lab Sample ID:	D27858-1			Date Received:	09/21/11
Matrix:	SO - Sludge			Percent Solids:	65.5
Method:	SW846 8260B				
Project:	XOM FRU 297-28C				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V17636.D	1	09/23/11	DC	n/a	n/a	V5V1048
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.13 g	5.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	100	44	ug/kg	
108-88-3	Toluene	205	200	100	ug/kg	
100-41-4	Ethylbenzene	193	200	50	ug/kg	J
1330-20-7	Xylene (total)	4050	400	200	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	109%		61-130%
460-00-4	4-Bromofluorobenzene	108%		53-131%
17060-07-0	1,2-Dichloroethane-D4	123%		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

Report of Analysis

Client Sample ID:	FRESH WATER CONTENTS				
Lab Sample ID:	D27858-1	Date Sampled:	09/20/11		
Matrix:	SO - Sludge	Date Received:	09/21/11		
Method:	SW846 8270C BY SIM	Percent Solids:	65.5		
Project:	XOM FRU 297-28C				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G06189.D	25	09/23/11	TMB	09/22/11	OP4520	E3G224
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	532	250	200	ug/kg	
120-12-7	Anthracene	ND	250	230	ug/kg	
56-55-3	Benzo(a)anthracene	ND	630	330	ug/kg	
50-32-8	Benzo(a)pyrene	ND	630	460	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	630	470	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	630	280	ug/kg	
218-01-9	Chrysene	ND	630	280	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	630	470	ug/kg	
206-44-0	Fluoranthene	ND	250	250	ug/kg	
86-73-7	Fluorene	1720	250	220	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	760	700	ug/kg	
91-20-3	Naphthalene	414	250	240	ug/kg	
129-00-0	Pyrene	ND	250	240	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	43%		10-145%
321-60-8	2-Fluorobiphenyl	14%		10-130%
1718-51-0	Terphenyl-d14	17% ^a		22-130%

(a) Outside control limits 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

Report of Analysis

Client Sample ID:	FRESH WATER CONTENTS			
Lab Sample ID:	D27858-1	Date Sampled:	09/20/11	
Matrix:	SO - Sludge	Date Received:	09/21/11	
Method:	SW846 8015B	Percent Solids:	65.5	
Project:	XOM FRU 297-28C			

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB13108.D	1	09/21/11	SK	n/a	n/a	GGB747
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	20.0 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	83.2	100	50	mg/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	96%		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

Report of Analysis

Client Sample ID:	FRESH WATER CONTENTS					Date Sampled:	09/20/11
Lab Sample ID:	D27858-1					Date Received:	09/21/11
Matrix:	SO - Sludge					Percent Solids:	65.5
Method:	SW846-8015B SW846 3546						
Project:	XOM FRU 297-28C						

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD10231.D	10	09/23/11	KV	09/22/11	OP4519	GFD479
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	7.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	88500	710	460	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	82%		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: FRESH WATER CONTENTS**Lab Sample ID:** D27858-1**Matrix:** SO - Sludge**Project:** XOM FRU 297-28C**Date Sampled:** 09/20/11**Date Received:** 09/21/11**Percent Solids:** 65.5**Metals Analysis**

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	6.8	0.63	mg/kg	5	09/22/11	09/22/11 GJ	SW846 6020 ²	SW846 3050B ⁵
Barium	5140	7.9	mg/kg	5	09/22/11	09/23/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Cadmium	< 1.6	1.6	mg/kg	1	09/22/11	09/22/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Chromium	41.9	1.6	mg/kg	1	09/22/11	09/22/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Copper	37.0	1.6	mg/kg	1	09/22/11	09/22/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Lead	25.5	7.9	mg/kg	1	09/22/11	09/22/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Mercury	0.60	0.15	mg/kg	1	09/22/11	09/23/11 JM	SW846 7471A ³	SW846 7471A ⁶
Nickel	18.8	4.7	mg/kg	1	09/22/11	09/22/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Selenium ^a	< 39	39	mg/kg	5	09/22/11	09/23/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Silver	< 4.7	4.7	mg/kg	1	09/22/11	09/22/11 JM	SW846 6010B ¹	SW846 3050B ⁴
Zinc	130	4.7	mg/kg	1	09/22/11	09/22/11 JM	SW846 6010B ¹	SW846 3050B ⁴

(1) Instrument QC Batch: MA1843

(2) Instrument QC Batch: MA1845

(3) Instrument QC Batch: MA1847

(4) Prep QC Batch: MP5834

(5) Prep QC Batch: MP5835

(6) Prep QC Batch: MP5837

(a) Elevated detection limit due to dilution required for possible matrix interference.

RL = Reporting Limit

Report of Analysis

Client Sample ID: FRESH WATER CONTENTS**Lab Sample ID:** D27858-1**Matrix:** SO - Sludge**Project:** XOM FRU 297-28C**Date Sampled:** 09/20/11**Date Received:** 09/21/11**Percent Solids:** 65.5

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.59	0.59	mg/kg	1	09/26/11 14:53	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	41.9	2.2	mg/kg	1	09/26/11 14:53	AMA	SW846 3060/7196A M
Redox Potential Vs H2	287		mv	1	09/21/11	JD	ASTM D1498-76M
Solids, Percent	65.5		%	1	09/21/11	SWT	SM19 2540B M
Specific Conductivity	362	1.0	umhos/cm	1	09/26/11	JK	DEPT.OF AG, BOOK N9
pH	8.57		su	1	09/21/11 15:00	JD	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:	FRESH WATER CONTENTS	
Lab Sample ID:	D27858-1A	Date Sampled: 09/20/11
Matrix:	SO - Sludge	Date Received: 09/21/11
		Percent Solids: 65.5
Project:	XOM FRU 297-28C	

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	12.4	2.0	mg/l	1	09/22/11	09/22/11 JM	SW846 6010B ¹	EPA 200.7 ²
Magnesium	1.01	1.0	mg/l	1	09/22/11	09/22/11 JM	SW846 6010B ¹	EPA 200.7 ²
Sodium	62.0	2.0	mg/l	1	09/22/11	09/22/11 JM	SW846 6010B ¹	EPA 200.7 ²

(1) Instrument QC Batch: MA1843
(2) Prep QC Batch: MP5836

RL = Reporting Limit

Report of Analysis

Client Sample ID:	FRESH WATER CONTENTS	
Lab Sample ID:	D27858-1A	Date Sampled: 09/20/11
Matrix:	SO - Sludge	Date Received: 09/21/11
		Percent Solids: 65.5
Project:	XOM FRU 297-28C	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	4.55		ratio	1	09/22/11 14:40	JM	USDA HANDBOOK 60

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

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

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

[illegible]

4.4.1

D27858: Chain of Custody

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Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D27858

Client: KRW

Immediate Client Services Action Required: No

Date / Time Received: 9/21/2011 12:45:00 PM

No. Coolers: 1

Client Service Action Required at Login: No

Project: XOM

Airbill #'s: CO

Cooler Security
Y or N
Y or N

- | | |
|--|--|
| 1. Custody Seals Present: <input checked="" type="checkbox"/> <input type="checkbox"/> | 3. COC Present: <input checked="" type="checkbox"/> <input type="checkbox"/> |
| 2. Custody Seals Intact: <input checked="" type="checkbox"/> <input type="checkbox"/> | 4. Smpl Dates/Time OK <input checked="" type="checkbox"/> <input type="checkbox"/> |

Cooler Temperature
Y or N

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

Quality Control Preservation
Y or N
N/A

- | | |
|---|--|
| 1. Trip Blank present / cooler: <input type="checkbox"/> <input type="checkbox"/> | |
| 2. Trip Blank listed on COC: <input type="checkbox"/> <input type="checkbox"/> | |
| 3. Samples preserved properly: <input checked="" type="checkbox"/> <input type="checkbox"/> | |
| 4. VOCs headspace free: <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> | |

Sample Integrity - Documentation
Y or N

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

Sample Integrity - Condition
Y or N

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

Sample Integrity - Instructions
Y or N N/A

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

Comments

 Accutest Laboratories
 V: (303) 425-6021

 4036 Youngfield Street
 F: (303) 425-6854

 Wheat Ridge, CO
 www.accutest.com

GC/MS Volatiles

5

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Page 1 of 1

Job Number: D27858

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V1048-MB	5V17625.D	1	09/23/11	DC	n/a	n/a	V5V1048

The QC reported here applies to the following samples:

Method: SW846 8260B

D27858-1

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	105% 61-130%
460-00-4	4-Bromofluorobenzene	92% 53-131%
17060-07-0	1,2-Dichloroethane-D4	113% 62-130%

Blank Spike Summary

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Job Number: D27858

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V1048-BS	5V17626.D	1	09/23/11	DC	n/a	n/a	V5V1048

The QC reported here applies to the following samples:

Method: SW846 8260B

D27858-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	50.8	102	70-130
100-41-4	Ethylbenzene	50	48.4	97	70-130
108-88-3	Toluene	50	50.0	100	70-130
1330-20-7	Xylene (total)	150	150	100	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
2037-26-5	Toluene-D8	108%	61-130%
460-00-4	4-Bromofluorobenzene	106%	53-131%
17060-07-0	1,2-Dichloroethane-D4	114%	62-130%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D27858
Account: KRWCCOL KRW Consulting, Inc.
Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D27929-1MS	5V17629.D	1	09/23/11	DC	n/a	n/a	V5V1048
D27929-1MSD	5V17630.D	1	09/23/11	DC	n/a	n/a	V5V1048
D27929-1	5V17628.D	1	09/23/11	DC	n/a	n/a	V5V1048

The QC reported here applies to the following samples:

Method: SW846 8260B

D27858-1

CAS No.	Compound	D27929-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		3080	3070	100	3150	102	3	70-134/30
100-41-4	Ethylbenzene	ND		3080	2950	96	3000	97	2	70-137/30
108-88-3	Toluene	ND		3080	2950	96	3000	97	2	70-130/30
1330-20-7	Xylene (total)	ND		9240	9280	100	9390	102	1	61-131/30

CAS No.	Surrogate Recoveries	MS	MSD	D27929-1	Limits
2037-26-5	Toluene-D8	107%	106%	107%	61-130%
460-00-4	4-Bromofluorobenzene	117%	115%	104%	53-131%
17060-07-0	1,2-Dichloroethane-D4	113%	114%	115%	62-130%

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

Page 1 of 1

Job Number: D27858

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4520-MB	3G06171.D	1	09/22/11	TMB	09/22/11	OP4520	E3G223

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D27858-1

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	96% 10-145%
321-60-8	2-Fluorobiphenyl	94% 10-130%
1718-51-0	Terphenyl-d14	107% 22-130%

Blank Spike Summary

Page 1 of 1

Job Number: D27858

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4520-BS	3G06172.D	1	09/22/11	TMB	09/22/11	OP4520	E3G223

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D27858-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	64.1	77	34-130
120-12-7	Anthracene	83.3	69.8	84	35-130
56-55-3	Benzo(a)anthracene	83.3	63.7	76	36-130
50-32-8	Benzo(a)pyrene	83.3	60.8	73	36-130
205-99-2	Benzo(b)fluoranthene	83.3	61.2	73	35-130
207-08-9	Benzo(k)fluoranthene	83.3	77.4	93	37-130
218-01-9	Chrysene	83.3	69.0	83	40-130
53-70-3	Dibenzo(a,h)anthracene	83.3	56.6	68	32-130
206-44-0	Fluoranthene	83.3	61.8	74	38-130
86-73-7	Fluorene	83.3	66.7	80	35-130
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	49.2	59	28-130
91-20-3	Naphthalene	83.3	67.6	81	35-130
129-00-0	Pyrene	83.3	75.3	90	37-130

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	91%	10-145%
321-60-8	2-Fluorobiphenyl	82%	10-130%
1718-51-0	Terphenyl-d14	99%	22-130%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D27858
Account: KRWCCOL KRW Consulting, Inc.
Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4520-MS	3G06174.D	5	09/22/11	TMB	09/22/11	OP4520	E3G223
OP4520-MSD	3G06175.D	5	09/22/11	TMB	09/22/11	OP4520	E3G223
D27856-1	3G06173.D	5	09/22/11	TMB	09/22/11	OP4520	E3G223

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D27858-1

CAS No.	Compound	D27856-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		95.8	73.8	77	71.9	75	3	10-155/30
120-12-7	Anthracene	ND		95.8	74.3	78	73.6	77	1	10-155/30
56-55-3	Benzo(a)anthracene	ND		95.8	81.5	85	80.2	84	2	10-175/30
50-32-8	Benzo(a)pyrene	ND		95.8	72.4	76	74.4	78	3	10-164/30
205-99-2	Benzo(b)fluoranthene	ND		95.8	ND	0* a	72.2	76	200* b	10-165/30
207-08-9	Benzo(k)fluoranthene	ND		95.8	79.5	83	79.6	83	0	10-178/30
218-01-9	Chrysene	ND		95.8	73.3	76	72.7	76	1	10-147/30
53-70-3	Dibenzo(a,h)anthracene	ND		95.8	ND	0* a	ND	0* a	nc	10-144/30
206-44-0	Fluoranthene	ND		95.8	86.0	90	96.4	101	11	10-207/30
86-73-7	Fluorene	73.2		95.8	129	58	129	58	0	10-163/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		95.8	ND	0* a	ND	0* a	nc	10-180/30
91-20-3	Naphthalene	66.6		95.8	134	70	122	58	9	10-198/30
129-00-0	Pyrene	ND		95.8	107	112	102	107	5	10-189/30

CAS No.	Surrogate Recoveries	MS	MSD	D27856-1	Limits
4165-60-0	Nitrobenzene-d5	84%	79%	83%	10-145%
321-60-8	2-Fluorobiphenyl	70%	66%	72%	10-130%
1718-51-0	Terphenyl-d14	82%	82%	83%	22-130%

(a) Outside control limits due to matrix interference. Refer to Blank Spike.

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

GC Volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Page 1 of 1

Job Number: D27858

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB747-MB	GB13099.D	1	09/21/11	SK	n/a	n/a	GGB747

The QC reported here applies to the following samples:

Method: SW846 8015B

D27858-1

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	82% 60-140%

Blank Spike Summary

Job Number: D27858
Account: KRWCCOL KRW Consulting, Inc.
Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB747-BS	GB13100.D	1	09/21/11	SK	n/a	n/a	GGB747

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

D27858-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	110	121	110	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	91%	60-140%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D27858
Account: KRWCCOL KRW Consulting, Inc.
Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D27795-1MS	GB13103.D	1	09/21/11	SK	n/a	n/a	GGB747
D27795-1MSD	GB13104.D	1	09/21/11	SK	n/a	n/a	GGB747
D27795-1	GB13102.D	1	09/21/11	SK	n/a	n/a	GGB747

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

D27858-1

CAS No.	Compound	D27795-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	9.18	J	143	158	104	160	105	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D27795-1	Limits
120-82-1	1,2,4-Trichlorobenzene	85%	93%	86%	60-140%

7.3.1
7

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

Page 1 of 1

Job Number: D27858

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4519-MB	FD10185.D	1	09/22/11	KV	09/22/11	OP4519	GFD475

The QC reported here applies to the following samples:

Method: SW846-8015B

D27858-1

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	86% 61-142%

8.1.1

8

Blank Spike Summary

Job Number: D27858
Account: KRWCCOL KRW Consulting, Inc.
Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4519-BS	FD10186.D	1	09/22/11	KV	09/22/11	OP4519	GFD475

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

D27858-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	548	82	60-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	91%	61-142%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D27858
Account: KRWCCOL KRW Consulting, Inc.
Project: XOM FRU 297-28C

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4519-MS	FD10187.D	1	09/22/11	KV	09/22/11	OP4519	GFD475
OP4519-MSD	FD10188.D	1	09/22/11	KV	09/22/11	OP4519	GFD475
D27796-8	FD10189.D	1	09/22/11	KV	09/22/11	OP4519	GFD475

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

D27858-1

CAS No.	Compound	D27796-8 mg/kg	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	ND	710	548	77	546	77	0	24-157/35

CAS No.	Surrogate Recoveries	MS	MSD	D27796-8	Limits
84-15-1	o-Terphenyl	82%	86%	88%	61-142%

8.3.1
8

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: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 09/22/11

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	0.060	<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	-0.030	<1.0
Cobalt	0.50	.035	.035		
Copper	1.0	.085	.16	-0.14	<1.0
Iron	7.0	.34	2		
Lead	5.0	.16	.21	-0.16	<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	-0.050	<3.0
Phosphorus	10	1.1	1.2		
Potassium	200	5.5	9.2		
Selenium	5.0	.38	.5	0.060	<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	-0.17	<3.0

Associated samples MP5834: D27858-1

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

9.1.1

9

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 09/22/11

Metal	D27856-1 Original MS		Spikelot MPICPALL	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	anr				
Barium	1530	1840	240	129.2(a)	75-125
Beryllium					
Boron					
Cadmium	0.46	52.4	60	86.6	75-125
Calcium					
Chromium	32.7	76.8	60	73.5N(b)	75-125
Cobalt					
Copper	15.9	70.2	60	90.5	75-125
Iron					
Lead	13.7	111	120	81.1	75-125
Lithium					
Magnesium					
Manganese					
Molybdenum					
Nickel	18.8	61.6	60	71.3N(b)	75-125
Phosphorus					
Potassium					
Selenium	3.0	105	120	85.0	75-125
Silicon					
Silver	0.035	22.2	24	92.3	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc	44.3	86.4	60	70.2N(b)	75-125

Associated samples MP5834: D27858-1

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
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.
(b) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 09/22/11

Metal	D27856-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	1530	1840	230	134.5(a)	0.0	20
Beryllium						
Boron						
Cadmium	0.46	50.2	57.6	86.3	4.3	20
Calcium						
Chromium	32.7	74.5	57.6	72.6N(b)	3.0	20
Cobalt						
Copper	15.9	67.0	57.6	88.7	4.7	20
Iron						
Lead	13.7	107	115	81.0	3.7	20
Lithium						
Magnesium						
Manganese						
Molybdenum						
Nickel	18.8	60.2	57.6	71.9N(b)	2.3	20
Phosphorus						
Potassium						
Selenium	3.0	101	115	85.1	3.9	20
Silicon						
Silver	0.035	21.0	23	91.0	5.6	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	44.3	85.0	57.6	70.7N(b)	1.6	20

Associated samples MP5834: D27858-1

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
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.
- (b) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D27858
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-28C

QC Batch ID: MP5834
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Prep Date: 09/22/11

Metal	BSP Result	Spikelot MPICPAL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	178	200	89.0	80-120
Beryllium				
Boron				
Cadmium	44.8	50	89.6	80-120
Calcium				
Chromium	45.3	50	90.6	80-120
Cobalt				
Copper	45.1	50	90.2	80-120
Iron				
Lead	90.2	100	90.2	80-120
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	44.2	50	88.4	80-120
Phosphorus				
Potassium				
Selenium	89.2	100	89.2	80-120
Silicon				
Silver	18.8	20	94.0	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	44.1	50	88.2	80-120

Associated samples MP5834: D27858-1

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/22/11

Metal	D27856-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	13300	15500	16.4*(a)	0-10
Beryllium				
Boron				
Cadmium	4.00	2.50	37.5 (b)	0-10
Calcium				
Chromium	284	328	15.7*(a)	0-10
Cobalt				
Copper	138	142	2.6	0-10
Iron				
Lead	119	125	4.8	0-10
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	163	201	22.8*(a)	0-10
Phosphorus				
Potassium				
Selenium	26.1	46.5	78.2 (b)	0-10
Silicon				
Silver	0.300	2.00	566.7(b)	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	385	466	21.1*(a)	0-10

Associated samples MP5834: D27858-1

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5834
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).

9.1.4

9

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5835
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 09/22/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	5.0	.028	.24		
Antimony	0.040	.0002	.0019		
Arsenic	0.080	.0098	.043	0.047	<0.080
Barium	0.20	.0007	.02		
Beryllium	0.020	.0015	.0028		
Boron	4.0	.19	.21		
Cadmium	0.010	.0045	.0095		
Calcium	40	.36	1.6		
Chromium	0.20	.0041	.048		
Cobalt	0.020	.00065	.0006		
Copper	0.20	.0021	.013		
Iron	4.0	.16	.74		
Lead	0.050	.00024	.003		
Magnesium	10	.013	.52		
Manganese	0.10	.0014	.0058		
Molybdenum	0.10	.00087	.0046		
Nickel	0.20	.00057	.0061		
Phosphorus	6.0	.36	.7		
Potassium	20	.4	.64		
Selenium	0.040	.015	.037		
Silver	0.010	.00016	.0004		
Sodium	50	.16	.87		
Strontium	2.0	.00079	.008		
Thallium	0.020	.0029	.004		
Tin	1.0	.0012	.0056		
Titanium	0.20	.0069	.012		
Uranium	0.050	.000076	.00018		
Vanadium	0.40	.01	.059		
Zinc	1.0	.0077	.023		

Associated samples MP5835: D27858-1

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: D27858
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-28C

QC Batch ID: MP5835
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 09/22/11

Metal	D27856-1 Original MS		Spikelot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	8.3	132	120	103.1	60-119
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead	anr				
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP5835: D27858-1

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: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5835
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 09/22/11

Metal	D27856-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	8.3	126	115	102.2	4.7	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead	anr					
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP5835: D27858-1

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: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5835
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 09/22/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	99.8	100	99.8	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead	anr			
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP5835: D27858-1

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5835
Matrix Type: SOLID

Methods: SW846 6020
Units: ug/l

Prep Date: 09/22/11

Metal	D27856-1			QC	
	Original	SDL 5:25	%DIF	Limits	
Aluminum					
Antimony					
Arsenic	71.9	76.2	5.9	0-10	
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead	anr				
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP5835: D27858-1

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
Matrix Type: AQUEOUS

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

Prep Date: 09/22/11

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	269	<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	14.0	<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	293	<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 MP5836: D27858-1A

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
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: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
Matrix Type: AQUEOUS

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

Prep Date: 09/22/11

Metal	D27856-1A Original MS		Spikelot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	104000	244000	125000	112.0	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	1670	135000	125000	106.7	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	544000	683000	125000	111.2	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP5836: D27858-1A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
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: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
Matrix Type: AQUEOUS

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

Prep Date: 09/22/11

Metal	D27856-1A Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	104000	238000	125000	107.2
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	1670	135000	125000	106.7
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	544000	640000	125000	76.8
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP5836: D27858-1A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
Matrix Type: AQUEOUS

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

Prep Date: 09/22/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	139000	125000	111.2	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	135000	125000	108.0	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	133000	125000	106.4	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP5836: D27858-1A

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5836
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: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

QC Batch ID: MP5837
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 09/22/11

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.10	.0011	.013	0.0021	<0.10

Associated samples MP5837: D27858-1

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: D27858
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-28C

QC Batch ID: MP5837
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 09/22/11

Metal	D27740-1		Spikelot		QC	
	Original MS		HGWSR1		% Rec	
Mercury	0.046	1.9	1.88	98.4	85-115	

Associated samples MP5837: D27858-1

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: D27858
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-28C

QC Batch ID: MP5837
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 09/22/11

Metal	D27740-1 Original MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
Mercury	0.046	2.2	2.11	101.9	14.6

Associated samples MP5837: D27858-1

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: D27858
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-28C

QC Batch ID: MP5837
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 09/22/11

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.39	0.4	97.5	80-120

Associated samples MP5837: D27858-1

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

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: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP5539/GN11727	1.0	<1.0	umhos/cm	9980	9850	98.7	90-110%
pH	GN11677			su	8.00	7.96	99.5	99.3-100.7%

Associated Samples:
Batch GN11677: D27858-1
Batch GP5539: D27858-1
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D27858
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-28C

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Redox Potential Vs H2	GN11680	D27858-1	mv	287	300	4.4	0-20%

Associated Samples:
Batch GN11680: D27858-1
(*) Outside of QC limits

Misc. Forms

Custody Documents and Other Forms

(Accutest Labs of New England, Inc.)

Includes the following where applicable:

- Chain of Custody

Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D27858

Client: AMS

Immediate Client Services Action Required: No

Date / Time Received: 9/22/2011

Delivery Method:

Client Service Action Required at Login: No

Project:

No. Coolers: 1

Airbill #'s:

Cooler Security

Y or N

Y or N

- | | | | | | |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler Temperature

Y or N

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

Quality Control Preservation

Y or N

N/A

- | | | | |
|---------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Trip Blank listed on COC: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Samples preserved properly: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. VOCs headspace free: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Sample Integrity - Documentation

Y or N

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

Sample Integrity - Condition

Y or N

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

Sample Integrity - Instructions

Y or N N/A

- | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. Bottles received for unspecified tests | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. Sufficient volume recvd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. Compositing instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments

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: D27858
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-28C

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP13552/GN36269	0.40	0.0	mg/kg	40	42.4	106.0	80-120%
Chromium, Hexavalent	GP13552/GN36269			mg/kg	1000	946	94.6	80-120%

Associated Samples:
Batch GP13552: D27858-1
(*) Outside of QC limits

BLANK SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D27858
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-28C

Analyte	Batch ID	Units	Spike Amount	BSD Result	RPD	QC Limit
Chromium, Hexavalent	GP13552/GN36269	mg/kg	40	41.0	3.4	

Associated Samples:
Batch GP13552: D27858-1
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D27858
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-28C

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP13552/GN36269	D27856-1	mg/kg	0.0	0.0	0.0	0-20%

Associated Samples:
Batch GP13552: D27858-1
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D27858
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-28C

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP13552/GN36269	D27856-1	mg/kg	0.0	45.4	43.0	94.8	75-125%
Chromium, Hexavalent	GP13552/GN36269	D27856-1	mg/kg	0.0	825	987	119.7	75-125%

Associated Samples:

Batch GP13552: D27858-1

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits