



12/13/11

Technical Report for

KRW Consulting, Inc.

XOM FRU 297-20A

1108-10A

Accutest Job Number: D29982

Sampling Date: 12/05/11

Report to:

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Total number of pages in report: 73



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.


Brad Madadian
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: D29982

XOM FRU 297-20A
Project No: 1108-10A

Sample Number	Collected			Received	Matrix		Client Sample ID
	Date	Time	By		Code	Type	
D29982-1	12/05/11	12:30	CB	12/06/11	SO	Soil	FRESHWATER SUBLINER
D29982-1A	12/05/11	12:30	CB	12/06/11	SO	Soil	FRESHWATER 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 D29982

Site: XOM FRU 297-20A

Report Dat 12/13/2011 2:38:57 PM

On 12/06/2011, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 2.6 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D29982 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: V3V866

- All samples were analyzed within the recommended method holding time.
- Sample(s) D29943-1MS, D29943-1MSD 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: M:OP27160

- The data for SW846 8270C BY SIM meets quality control requirements.
- D29982-1: Analysis performed at Accutest Laboratories, Marlborough, MA.

Volatiles by GC By Method SW846 8015B

Matrix SO

Batch ID: GGB802

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D29946-1MS, D29946-1MSD were used as the QC samples indicated.

Extractables by GC By Method SW846-8015B

Matrix SO

Batch ID: OP4968

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D29982-1MS, D29982-1MSD 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: MP6407

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D29983-1AMS, D29983-1AMSD were used as the QC samples for the metals analysis.

Matrix SO

Batch ID: MP6409

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D29943-1MSD, D29943-1SDL, D29943-1MS, D29943-1MSD were used as the QC samples for the metals analysis.
- The matrix spike (MS) and matrix spike duplicate (MSD) recovery(s) of Selenium are outside control limits. Spike recovery indicates possible matrix interference.
- The matrix spike (MS) recovery(s) of Barium are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
- The RPD(s) for the MS and MSD recoveries of Selenium are outside control limits for sample MP6409-S2. High RPD due to possible sample matrix or nonhomogeneity.
- The serial dilution RPD(s) for Cadmium, Silver are outside control limits for sample MP6409-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- The serial dilution RPD(s) for Nickel, Zinc are outside control limits for sample MP6409-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 6020

Matrix SO

Batch ID: MP6410

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D29943-1MS, D29943-1MSD, D29943-1SDL were used as the QC samples for the metals analysis.
- The serial dilution RPD(s) for Arsenic are outside control limits for sample MP6410-SD1. Serial dilution indicates possible matrix interference.

Metals By Method SW846 7471A

Matrix SO

Batch ID: MP6404

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D29943-1MS, D29943-1MSD were used as the QC samples for the metals analysis.
- The matrix spike duplicate (MSD) recovery(s) of Mercury are outside control limits. Probable cause due to matrix interference.

Wet Chemistry By Method ASTM D1498-76M

Matrix SO

Batch ID: GN12778

- Sample(s) D29943-1DUP were used as the QC samples for the Redox Potential Vs H2 analysis.

Wet Chemistry By Method SM19 2540B M

Matrix SO

Batch ID: GN12783

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

Wet Chemistry By Method SW846 3060/7196A M

Matrix SO

Batch ID: R11056

- The data for SW846 3060/7196A M meets quality control requirements.
- D29982-1 for Chromium, Trivalent: Calculated as: (Chromium) - (Chromium, Hexavalent)

Wet Chemistry By Method SW846 3060A/7196A**Matrix** SO**Batch ID:** M:GP13892

- The data for SW846 3060A/7196A meets quality control requirements.
- D29982-1 for Chromium, Hexavalent: Analysis performed at Accutest Laboratories, Marlborough, MA.

Wet Chemistry By Method USDA HANDBOOK 60**Matrix** SO**Batch ID:** MP6407

- D29982-1A 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 D29982

Site: KRWCCOL: XOM FRU 297-20A

Report Date 12/13/2011 3:33:42 PM

1 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 12/05/2011 and were received at Accutest on 12/06/2011 properly preserved, at 1.4 Deg. C and intact. These Samples received an Accutest job number of D29982. 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.

Extractables by GCMS By Method SW846 8270C BY SIM

Matrix	SO	Batch ID:	OP27160
<ul style="list-style-type: none"> All samples were extracted 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) MC6135-IMS, MC6135-IMSD were used as the QC samples indicated. Matrix Spike Recovery(s) for Pyrene are outside control limits. Outside control limits due to possible matrix interference. Refer to Blank Spike. Matrix Spike Duplicate Recovery(s) for Benzo(a)anthracene, Chrysene, Fluoranthene, Pyrene are outside control limits. Outside control limits due to possible matrix interference. Refer to Blank Spike. D29982-1: Confirmation run for internal standard areas. OP27160-MSD for Nitrobenzene-d5: Outside control limits due to possible matrix interference. Confirmed by reanalysis. 			

Wet Chemistry By Method SW846 3060A/7196A

Matrix	SO	Batch ID:	GP13892
<ul style="list-style-type: none"> 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) D29982-IMS, D29982-IDUP were used as the QC samples for Chromium, Hexavalent. RPD(s) for Duplicate for Chromium, Hexavalent are outside control limits for sample GP13892-D1. RPD acceptable due to low duplicate and sample concentrations. 			

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(D29982).

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	FRESHWATER SUBLINER	
Lab Sample ID:	D29982-1	Date Sampled: 12/05/11
Matrix:	SO - Soil	Date Received: 12/06/11
Method:	SW846 8260B	Percent Solids: 84.6
Project:	XOM FRU 297-20A	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3V14960.D	1	12/07/11	KV	n/a	n/a	V3V866
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.03 g	5.0 ml	100 ul
Run #2			

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	68	30	ug/kg	
108-88-3	Toluene	ND	140	68	ug/kg	
100-41-4	Ethylbenzene	ND	140	34	ug/kg	
1330-20-7	Xylene (total)	ND	270	140	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	111%		61-130%
460-00-4	4-Bromofluorobenzene	120%		53-131%
17060-07-0	1,2-Dichloroethane-D4	104%		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:	FRESHWATER SUBLINER	Date Sampled:	12/05/11
Lab Sample ID:	D29982-1	Date Received:	12/06/11
Matrix:	SO - Soil	Percent Solids:	84.6
Method:	SW846 8270C BY SIM SW846 3546		
Project:	XOM FRU 297-20A		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	F53717.D	1	12/08/11	AMA	12/07/11	M:OP27160	M:MSF2585
Run #2 ^b	F53722.D	1	12/08/11	AMA	12/07/11	M:OP27160	M:MSF2585

	Initial Weight	Final Volume
Run #1	20.1 g	1.0 ml
Run #2	20.1 g	1.0 ml

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	5.9	0.68	ug/kg	
120-12-7	Anthracene	ND	5.9	0.95	ug/kg	
56-55-3	Benzo(a)anthracene	ND	5.9	0.73	ug/kg	
50-32-8	Benzo(a)pyrene	ND	5.9	0.85	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	5.9	0.72	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	5.9	1.1	ug/kg	
218-01-9	Chrysene	ND	5.9	0.90	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.9	1.7	ug/kg	
206-44-0	Fluoranthene	ND	5.9	0.93	ug/kg	
86-73-7	Fluorene	ND	5.9	0.52	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.9	1.5	ug/kg	
91-20-3	Naphthalene	ND	5.9	1.3	ug/kg	
129-00-0	Pyrene	ND	5.9	2.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	73%	85%	30-130%
321-60-8	2-Fluorobiphenyl	64%	60%	30-130%
1718-51-0	Terphenyl-d14	76%	80%	30-130%

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Confirmation run for internal standard areas. Analysis performed at Accutest Laboratories, Marlborough, MA.

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:	FRESHWATER SUBLINER	
Lab Sample ID:	D29982-1	Date Sampled: 12/05/11
Matrix:	SO - Soil	Date Received: 12/06/11
Method:	SW846 8015B	Percent Solids: 84.6
Project:	XOM FRU 297-20A	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB14213.D	1	12/06/11	SK	n/a	n/a	GGB802
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	14	6.8	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	100%		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:	FRESHWATER SUBLINER	Date Sampled:	12/05/11
Lab Sample ID:	D29982-1	Date Received:	12/06/11
Matrix:	SO - Soil	Percent Solids:	84.6
Method:	SW846-8015B SW846 3546		
Project:	XOM FRU 297-20A		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI04806.D	1	12/10/11	TR	12/07/11	OP4968	GFI357
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	86.5	16	10	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	84%		43-136%		

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: FRESHWATER SUBLINER

Lab Sample ID: D29982-1

Matrix: SO - Soil

Project: XOM FRU 297-20A

Date Sampled: 12/05/11

Date Received: 12/06/11

Percent Solids: 84.6

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	6.4	0.48	mg/kg	5	12/07/11	12/08/11 GJ	SW846 6020 ³	SW846 3050B ⁶
Barium	360	1.2	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Cadmium	< 1.2	1.2	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Chromium	30.4	1.2	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Copper	13.4	1.2	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Lead	12.4	6.0	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Mercury	< 0.12	0.12	mg/kg	1	12/06/11	12/07/11 JB	SW846 7471A ¹	SW846 7471A ⁴
Nickel	16.3	3.6	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Selenium	< 6.0	6.0	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Silver	< 3.6	3.6	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵
Zinc	42.4	3.6	mg/kg	1	12/07/11	12/07/11 JB	SW846 6010B ²	SW846 3050B ⁵

(1) Instrument QC Batch: MA2030

(2) Instrument QC Batch: MA2034

(3) Instrument QC Batch: MA2036

(4) Prep QC Batch: MP6404

(5) Prep QC Batch: MP6409

(6) Prep QC Batch: MP6410

RL = Reporting Limit

Report of Analysis

Client Sample ID: FRESHWATER SUBLINER**Lab Sample ID:** D29982-1**Matrix:** SO - Soil**Project:** XOM FRU 297-20A**Date Sampled:** 12/05/11**Date Received:** 12/06/11**Percent Solids:** 84.6**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent ^a	< 0.47	0.47	mg/kg	1	12/08/11 15:34	AMA	SW846 3060A/7196A
Chromium, Trivalent ^b	29.9	1.7	mg/kg	1	12/08/11 15:34	AMA	SW846 3060/7196A M
Redox Potential Vs H2	457		mv	1	12/06/11 12:15	JK	ASTM D1498-76M
Solids, Percent	84.6		%	1	12/07/11	SWT	SM19 2540B M
Specific Conductivity	1830	1.0	umhos/cm	1	12/07/11	JD	DEPT.OF AG, BOOK N9
pH	8.51		su	1	12/06/11 15:10	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:	FRESHWATER SUBLINER	Date Sampled:	12/05/11
Lab Sample ID:	D29982-1A	Date Received:	12/06/11
Matrix:	SO - Soil	Percent Solids:	84.6
Project:	XOM FRU 297-20A		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	136	2.0	mg/l	1	12/07/11	12/07/11 JB	SW846 6010B ¹	EPA 200.7 ²
Magnesium	83.2	1.0	mg/l	1	12/07/11	12/07/11 JB	SW846 6010B ¹	EPA 200.7 ²
Sodium	187	2.0	mg/l	1	12/07/11	12/07/11 JB	SW846 6010B ¹	EPA 200.7 ²

(1) Instrument QC Batch: MA2034
(2) Prep QC Batch: MP6407

RL = Reporting Limit

Report of Analysis

Client Sample ID:	FRESHWATER SUBLINER	Date Sampled:	12/05/11
Lab Sample ID:	D29982-1A	Date Received:	12/06/11
Matrix:	SO - Soil	Percent Solids:	84.6
Project:	XOM FRU 297-20A		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	3.12		ratio	1	12/07/11 15:34	JB	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

FED-EX Tracking #		Bottle Order Control #	
Accutest Quote #		Accutest Job # D29982	
Requested Analysis (see TEST CODE sheet)			Matrix Codes
Bottleline	Table 910-1	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 - Wipes FB - Field Blank RB - Rinse Blank TB - Trip Blank	LAB USE ONLY
			01 p100
Comments / Special Instructions			
Please email results to KRW p100ance & XOM Team			
Including courier delivery.			
Date Time:	Received By:	1216 12:10	
Date Time:	Received By:	4	
Preserved where applicable		On Ice	Cooler Temp.
<input type="checkbox"/> Intact <input type="checkbox"/> Not intact		<input checked="" type="checkbox"/>	26

4.4.1

D29982: Chain of Custody

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Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D29982

Client: KRW CONSULTING INC.

Immediate Client Services Action Required: No

Date / Time Received: 12/6/2011 12:10:00 PM

No. Coolers: 1

Client Service Action Required at Login: No

Project: XOM FRU 297-20A

Airbill #'s: HD/CO

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

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

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

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

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

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

Comments

Accutest Laboratories
V:(303) 425-6021

4036 Youngfield Street
F: (303) 425-6854

Wheat Ridge, CO
www.accutest.com

GC/MS Volatiles

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: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V3V866-MB	3V14953.D	1	12/07/11	KV	n/a	n/a	V3V866

The QC reported here applies to the following samples:

Method: SW846 8260B

D29982-1

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	113% 53-131%
17060-07-0	1,2-Dichloroethane-D4	112% 62-130%

Blank Spike Summary

Page 1 of 1

Job Number: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V3V866-BS	3V14954.D	1	12/07/11	KV	n/a	n/a	V3V866

The QC reported here applies to the following samples:

Method: SW846 8260B

D29982-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	50.7	101	70-130
100-41-4	Ethylbenzene	50	49.6	99	70-130
108-88-3	Toluene	50	50.2	100	70-130
1330-20-7	Xylene (total)	150	150	100	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
2037-26-5	Toluene-D8	111%	61-130%
460-00-4	4-Bromofluorobenzene	120%	53-131%
17060-07-0	1,2-Dichloroethane-D4	109%	62-130%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D29943-1MS	3V14956.D	1	12/07/11	KV	n/a	n/a	V3V866
D29943-1MSD	3V14957.D	1	12/07/11	KV	n/a	n/a	V3V866
D29943-1	3V14955.D	1	12/07/11	KV	n/a	n/a	V3V866

The QC reported here applies to the following samples:

Method: SW846 8260B

D29982-1

CAS No.	Compound	D29943-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	944		4520	5940	111	5950	111	0	70-134/30
100-41-4	Ethylbenzene	1320		4520	6070	105	6190	108	2	70-137/30
108-88-3	Toluene	6430		4520	11300	108	11600	114	3	70-130/30
1330-20-7	Xylene (total)	5800		13600	20100	106	20300	107	1	61-131/30

CAS No.	Surrogate Recoveries	MS	MSD	D29943-1	Limits
2037-26-5	Toluene-D8	109%	109%	108%	61-130%
460-00-4	4-Bromofluorobenzene	127%	124%	122%	53-131%
17060-07-0	1,2-Dichloroethane-D4	109%	109%	107%	62-130%

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: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB802-MB	GB14202.D	1	12/06/11	SK	n/a	n/a	GGB802

The QC reported here applies to the following samples:

Method: SW846 8015B

D29982-1

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	98% 60-140%

Blank Spike Summary

Page 1 of 1

Job Number: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB802-BS	GB14203.D	1	12/06/11	SK	n/a	n/a	GGB802

The QC reported here applies to the following samples:

Method: SW846 8015B

D29982-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	110	112	102	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	114%	60-140%

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D29946-1MS	GB14205.D	1	12/06/11	SK	n/a	n/a	GGB802
D29946-1MSD	GB14206.D	1	12/06/11	SK	n/a	n/a	GGB802
D29946-1	GB14204.D	1	12/06/11	SK	n/a	n/a	GGB802

The QC reported here applies to the following samples:

Method: SW846 8015B

D29982-1

CAS No.	Compound	D29946-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	12.7	J	291	288	95	292	96	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D29946-1	Limits
120-82-1	1,2,4-Trichlorobenzene	102%	101%	97%	60-140%

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: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4968-MB	FI04802.D	1	12/09/11	TR	12/07/11	OP4968	GFI357

The QC reported here applies to the following samples:

Method: SW846-8015B

D29982-1

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	88% 43-136%

Blank Spike Summary

Page 1 of 1

Job Number: D29982

Account: KRWCCOL KRW Consulting, Inc.

Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4968-BS	FI04803.D	1	12/10/11	TR	12/07/11	OP4968	GFI357

The QC reported here applies to the following samples:

Method: SW846-8015B

D29982-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	561	84	58-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	90%	43-136%

7.2.1

7

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D29982
Account: KRWCCOL KRW Consulting, Inc.
Project: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP4968-MS	FI04804.D	1	12/10/11	TR	12/07/11	OP4968	GFI357
OP4968-MSD	FI04805.D	1	12/10/11	TR	12/07/11	OP4968	GFI357
D29982-1	FI04806.D	1	12/10/11	TR	12/07/11	OP4968	GFI357

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

D29982-1

CAS No.	Compound	D29982-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	86.5		786	500	53	507	54	1	20-183/43

CAS No.	Surrogate Recoveries	MS	MSD	D29982-1	Limits
84-15-1	o-Terphenyl	67%	67%	84%	43-136%

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: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6404
Matrix Type: SOLID

Methods: SW846 7471A
Units: mg/kg

Prep Date: 12/06/11

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.10	.0011	.013	-0.00013	<0.10

Associated samples MP6404: D29982-1

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: D29982
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-20A

QC Batch ID: MP6404
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 12/06/11

Metal	D29943-1 Original MS	Spikelot HGWSR1	% Rec	QC Limits
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Mercury	0.035	0.48	0.521	85.4	85-115
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Associated samples MP6404: D29982-1

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

8.1.2

8

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D29982
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-20A

QC Batch ID: MP6404
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 12/06/11

Metal	D29943-1 Original	MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
Mercury	0.035	0.52	0.586	82.8N(a)	8.0	20

Associated samples MP6404: D29982-1

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

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

8.1.2

8

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D29982
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-20A

QC Batch ID: MP6404
 Matrix Type: SOLID

Methods: SW846 7471A
 Units: mg/kg

Prep Date: 12/06/11

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
Mercury	0.42	0.4	105.0	80-120

Associated samples MP6404: D29982-1

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

8.1.3

8

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
Matrix Type: AQUEOUS

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

Prep Date: 12/07/11

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	-12	<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	12.5	<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	-88	<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 MP6407: D29982-1A

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
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: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
Matrix Type: AQUEOUS

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

Prep Date: 12/07/11

Metal	D29983-1A Original MS		Spikelot MPICPAL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	45200	185000	125000	111.8	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	24500	155000	125000	104.4	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	79200	212000	125000	106.2	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP6407: D29982-1A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
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: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
Matrix Type: AQUEOUS

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

Prep Date: 12/07/11

Metal	D29983-1A Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	45200	186000	125000	112.6
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	24500	156000	125000	105.2
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	79200	217000	125000	110.2
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP6407: D29982-1A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
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: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
Matrix Type: AQUEOUS

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

Prep Date: 12/07/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	138000	125000	110.4	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	127000	125000	101.6	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	130000	125000	104.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP6407: D29982-1A

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6407
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: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 12/07/11

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	0.020	<1.0
Beryllium	1.0	.044	.1		
Boron	5.0	.48	.48		
Cadmium	1.0	.027	.27	-0.010	<1.0
Calcium	40	.96	1.1		
Chromium	1.0	.018	.031	0.050	<1.0
Cobalt	0.50	.035	.035		
Copper	1.0	.085	.16	0.030	<1.0
Iron	7.0	.34	2		
Lead	5.0	.16	.21	-0.010	<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	-0.020	<3.0
Phosphorus	10	1.1	1.2		
Potassium	200	5.5	9.2		
Selenium	5.0	.38	.5	0.010	<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	0.12	<3.0

Associated samples MP6409: D29982-1

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

8.3.1

8

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 12/07/11

Metal	D29943-1 Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	anr				
Barium	6190	8630	290	841.4(a)	75-125
Beryllium					
Boron					
Cadmium	0.14	64.1	72.5	88.2	75-125
Calcium					
Chromium	12.8	75.4	72.5	86.3	75-125
Cobalt	anr				
Copper	27.5	100	72.5	100.0	75-125
Iron	anr				
Lead	16.4	143	145	87.3	75-125
Lithium					
Magnesium					
Manganese					
Molybdenum					
Nickel	15.1	76.5	72.5	84.7	75-125
Phosphorus					
Potassium					
Selenium	0.0	192	145	132.4N(b)	75-125
Silicon					
Silver	0.11	27.8	29	95.5	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc	49.9	113	72.5	87.0	75-125

Associated samples MP6409: D29982-1

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
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.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date: 12/07/11

Metal	D29943-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	6190	6220	287	10.5 (a)	14.5	20
Beryllium						
Boron						
Cadmium	0.14	63.4	71.8	88.2	1.1	20
Calcium						
Chromium	12.8	73.4	71.8	84.4	2.7	20
Cobalt	anr					
Copper	27.5	98.8	71.8	99.4	1.2	20
Iron	anr					
Lead	16.4	141	144	86.8	1.4	20
Lithium						
Magnesium						
Manganese						
Molybdenum						
Nickel	15.1	90.2	71.8	104.7	16.4	20
Phosphorus						
Potassium						
Selenium	0.0	195	144	135.9N(b)	35.6 (c)	20
Silicon						
Silver	0.11	27.4	28.7	95.1	1.4	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	49.9	108	71.8	81.0	4.5	20

Associated samples MP6409: D29982-1

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
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.
- (c) High RPD due to possible sample matrix or nonhomogeneity.

8.3.2

8

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D29982
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-20A

QC Batch ID: MP6409
 Matrix Type: SOLID

Methods: SW846 6010B
 Units: mg/kg

Prep Date: 12/07/11

Metal	BSP Result	Spikelot MPICPAL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	209	200	104.5	80-120
Beryllium				
Boron				
Cadmium	46.7	50	93.4	80-120
Calcium				
Chromium	48.1	50	96.2	80-120
Cobalt	anr			
Copper	50.1	50	100.2	80-120
Iron	anr			
Lead	94.9	100	94.9	80-120
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	46.1	50	92.2	80-120
Phosphorus				
Potassium				
Selenium	96.4	100	96.4	80-120
Silicon				
Silver	20.0	20	100.0	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	46.8	50	93.6	80-120

Associated samples MP6409: D29982-1

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
Matrix Type: SOLID

Methods: SW846 6010B
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

8.3.3

8

SERIAL DILUTION RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date: 12/07/11

Metal	D29943-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	42700	50700	7.7	0-10
Beryllium				
Boron				
Cadmium	1.10	0.00	100.0(a)	0-10
Calcium				
Chromium	97.6	107	9.1	0-10
Cobalt	anr			
Copper	209	211	0.6	0-10
Iron	anr			
Lead	125	125	0.1	0-10
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	115	132	14.3*(b)	0-10
Phosphorus				
Potassium				
Selenium	19.7	0.00		0-10
Silicon				
Silver	0.800	3.00	275.0(a)	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	380	467	22.9*(b)	0-10

Associated samples MP6409: D29982-1

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6409
Matrix Type: SOLID

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

- (anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
(b) Serial dilution indicates possible matrix interference.

8.3.4

8

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6410
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 12/07/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.14	1.2		
Antimony	0.20	.001	.0095		
Arsenic	0.40	.049	.22	-0.027	<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 MP6410: D29982-1

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: D29982
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-20A

QC Batch ID: MP6410
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 12/07/11

Metal	D29943-1 Original MS		Spikelot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	6.6	153	145	101.0	75-125
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP6410: D29982-1

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: D29982
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-20A

QC Batch ID: MP6410
 Matrix Type: SOLID

Methods: SW846 6020
 Units: mg/kg

Prep Date: 12/07/11

Metal	D29943-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	6.6	159	144	106.2	3.8	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP6410: D29982-1

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

8.4.2
8

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

QC Batch ID: MP6410
Matrix Type: SOLID

Methods: SW846 6020
Units: mg/kg

Prep Date: 12/07/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	102	100	102.0	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP6410: D29982-1

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

8.4.3
8

SERIAL DILUTION RESULTS SUMMARY

Login Number: D29982
 Account: KRWCCOL - KRW Consulting, Inc.
 Project: XOM FRU 297-20A

QC Batch ID: MP6410
 Matrix Type: SOLID

Methods: SW846 6020
 Units: ug/l

Prep Date: 12/07/11

Metal	D29943-1		QC	
	Original	SDL 5:25	%DIF	Limits
Aluminum				
Antimony				
Arsenic	49.9	57.5	15.2*(a)	0-10
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP6410: D29982-1

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

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: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP6067/GN12787			umhos/cm	10008	10800	107.9	90-110%
pH	GN12781			su	8.00	7.95	99.4	99.3-100.7%

Associated Samples:
Batch GN12781: D29982-1
Batch GP6067: D29982-1
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D29982
Account: KRWCCOL - KRW Consulting, Inc.
Project: XOM FRU 297-20A

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Redox Potential Vs H2	GN12778	D29943-1	mv	325	335	3.0	0-20%

Associated Samples:
Batch GN12778: D29982-1
(*) 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: D29982

Client: AMS

Immediate Client Services Action Required: No

Date / Time Received: 12/7/2011

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

GC/MS Semi-volatiles

QC Data Summaries

(Accutest Labs of New England, Inc.)

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: D29982
Account: ALMS Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP27160-MB	F53711.D	1	12/08/11	PR	12/07/11	OP27160	MSF2585

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D29982-1

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	5.0	0.58	ug/kg	
120-12-7	Anthracene	ND	5.0	0.81	ug/kg	
56-55-3	Benzo(a)anthracene	ND	5.0	0.62	ug/kg	
50-32-8	Benzo(a)pyrene	ND	5.0	0.72	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	5.0	0.61	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	5.0	0.95	ug/kg	
218-01-9	Chrysene	ND	5.0	0.77	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.0	1.4	ug/kg	
206-44-0	Fluoranthene	ND	5.0	0.79	ug/kg	
86-73-7	Fluorene	ND	5.0	0.44	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.0	1.3	ug/kg	
91-20-3	Naphthalene	ND	5.0	1.1	ug/kg	
129-00-0	Pyrene	ND	5.0	1.7	ug/kg	

CAS No.	Surrogate Recoveries	Limits
4165-60-0	Nitrobenzene-d5	102% 30-130%
321-60-8	2-Fluorobiphenyl	87% 30-130%
1718-51-0	Terphenyl-d14	107% 30-130%

Blank Spike Summary

Page 1 of 1

Job Number: D29982

Account: ALMS Accutest Mountain States

Project: KRWCCOL: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP27160-BS	F53712.D	1	12/08/11	PR	12/07/11	OP27160	MSF2585

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D29982-1

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	2490	2050	82	40-140
120-12-7	Anthracene	2490	1800	72	40-140
56-55-3	Benzo(a)anthracene	2490	2450	98	40-140
50-32-8	Benzo(a)pyrene	2490	1870	75	40-140
205-99-2	Benzo(b)fluoranthene	2490	1820	73	40-140
207-08-9	Benzo(k)fluoranthene	2490	2030	82	40-140
218-01-9	Chrysene	2490	2380	96	40-140
53-70-3	Dibenzo(a,h)anthracene	2490	2870	115	40-140
206-44-0	Fluoranthene	2490	2120	85	40-140
86-73-7	Fluorene	2490	2370	95	40-140
193-39-5	Indeno(1,2,3-cd)pyrene	2490	2860	115	40-140
91-20-3	Naphthalene	2490	1800	72	40-140
129-00-0	Pyrene	2490	2320	93	40-140

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	100%	30-130%
321-60-8	2-Fluorobiphenyl	85%	30-130%
1718-51-0	Terphenyl-d14	98%	30-130%

11.2.1
11

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D29982
Account: ALMS Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-20A

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP27160-MS	F53713.D	1	12/08/11	PR	12/07/11	OP27160	MSF2585
OP27160-MSD	F53714.D	1	12/08/11	PR	12/07/11	OP27160	MSF2585
MC6135-1	F53715.D	1	12/08/11	PR	12/07/11	OP27160	MSF2585
MC6135-1 ^a	F53720.D	1	12/08/11	PR	12/07/11	OP27160	MSF2585

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D29982-1

CAS No.	Compound	MC6135-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	123		2380	2190	87	2730	108	22	40-140/30
120-12-7	Anthracene	246		2380	2210	82	2610	98	17	40-140/30
56-55-3	Benzo(a)anthracene	773		2380	3520	115	4310	147* ^b	20	40-140/30
50-32-8	Benzo(a)pyrene	545		2380	2590	86	3290	114	24	40-140/30
205-99-2	Benzo(b)fluoranthene	522		2380	2620	88	3510	124	29	40-140/30
207-08-9	Benzo(k)fluoranthene	551		2380	2810	95	3530	123	23	40-140/30
218-01-9	Chrysene	724		2380	3410	113	4150	142* ^b	20	40-140/30
53-70-3	Dibenzo(a,h)anthracene	104		2380	2220	89	2500	99	12	40-140/30
206-44-0	Fluoranthene	1580		2380	4430	120	4980	141* ^b	12	40-140/30
86-73-7	Fluorene	279		2380	2930	111	3490	133	17	40-140/30
193-39-5	Indeno(1,2,3-cd)pyrene	294		2380	2430	90	2750	102	12	40-140/30
91-20-3	Naphthalene	843		2380	2550	72	3230	99	24	40-140/30
129-00-0	Pyrene	928		2380	4550	152* ^b	4870	163* ^b	7	40-140/30

CAS No.	Surrogate Recoveries	MS	MSD	MC6135-1	MC6135-1	Limits
4165-60-0	Nitrobenzene-d5	112%	248% * ^c	143% * ^c	163% * ^c	30-130%
321-60-8	2-Fluorobiphenyl	94%	119%	119%	125%	30-130%
1718-51-0	Terphenyl-d14	115%	97%	108%	96%	30-130%

(a) Confirmation run for internal standard areas.

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

(c) Outside control limits due to possible matrix interference. Confirmed by reanalysis.

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: D29982
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-20A

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP13892/GN37133	0.40	0.15	mg/kg	40	40.0	100.0	80-120%
Chromium, Hexavalent	GP13892/GN37133			mg/kg	869	905	104.1	80-120%

Associated Samples:
Batch GP13892: D29982-1
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D29982
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-20A

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP13892/GN37133	D29982-1	mg/kg	0.46	0.21	74.6(a)	0-20%

Associated Samples:
Batch GP13892: D29982-1
(*) Outside of QC limits
(a) RPD acceptable due to low duplicate and sample concentrations.

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D29982
Account: ALMS - Accutest Mountain States
Project: KRWCCOL: XOM FRU 297-20A

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP13892/GN37133	D29982-1	mg/kg	0.46	47.3	46.2	96.7	75-125%
Chromium, Hexavalent	GP13892/GN37133	D29982-1	mg/kg	0.46	1110	1310	118.0	75-125%

Associated Samples:
Batch GP13892: D29982-1
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits