



01/25/12

## Technical Report for

**XTO Energy**

**FRU 297-28C**

**1108-08A**

**Accutest Job Number: D31246**

**Sampling Date: 01/20/12**

### Report to:

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

**Total number of pages in report: 26**



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: Renea Jackson 303-425-6021**

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

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

# Table of Contents

-1-

**Section 1: Sample Summary ..... 3**

**Section 2: Case Narrative/Conformance Summary ..... 4**

**Section 3: Sample Results ..... 5**

**3.1: D31246-1: RP MIXBLEND DAY 4 ..... 6**

**3.2: D31246-2: RP MIXBLEND DAY 5 ..... 7**

**Section 4: Misc. Forms ..... 8**

**4.1: Chain of Custody ..... 9**

**Section 5: Metals Analysis - QC Data Summaries ..... 11**

**5.1: Prep QC MP6710: Ba ..... 12**

**5.2: Prep QC MP6711: As ..... 22**



Sample Summary

XTO Energy

Job No: D31246

FRU 297-28C

Project No: 1108-08A

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
D31246-1	01/20/12	12:00 DS	01/21/12	SO	Soil	RP MIXBLEND DAY 4
D31246-2	01/20/12	12:15 DS	01/21/12	SO	Soil	RP MIXBLEND DAY 5

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

## CASE NARRATIVE / CONFORMANCE SUMMARY

**Client:** XTO Energy

**Job No** D31246

**Site:** FRU 297-28C

**Report Date** 1/25/2012 9:41:52 AM

On 01/21/2012, 2 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 3.9 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D31246 was assigned to the project. The lab sample IDs, client sample IDs, 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.

### Metals By Method SW846 6010C

**Matrix** SO

**Batch ID:** MP6710

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D31167-1MSD, D31167-1SDL, D31167-1MS were used as the QC samples for the metals analysis.
- The matrix spike (MS) recovery(s) of Barium are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

### Metals By Method SW846 6020A

**Matrix** SO

**Batch ID:** MP6711

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D31167-1MS, D31167-1MSD, D31167-1SDL were used as the QC samples for the metals analysis.

### Wet Chemistry By Method SM19 2540B M

**Matrix** SO

**Batch ID:** GN13360

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

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 Results

## Report of Analysis

Report of Analysis

<b>Client Sample ID:</b>	RP MIXBLEND DAY 4	<b>Date Sampled:</b>	01/20/12
<b>Lab Sample ID:</b>	D31246-1	<b>Date Received:</b>	01/21/12
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	81.1
<b>Project:</b>	FRU 297-28C		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	4.3	0.49	mg/kg	5	01/23/12	01/23/12 GJ	SW846 6020A <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	5890	6.1	mg/kg	5	01/23/12	01/24/12 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>3</sup>

- (1) Instrument QC Batch: MA2134
- (2) Instrument QC Batch: MA2137
- (3) Prep QC Batch: MP6710
- (4) Prep QC Batch: MP6711

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	RP MIXBLEND DAY 5	<b>Date Sampled:</b>	01/20/12
<b>Lab Sample ID:</b>	D31246-2	<b>Date Received:</b>	01/21/12
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	79.3
<b>Project:</b>	FRU 297-28C		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	4.2	0.49	mg/kg	5	01/23/12	01/23/12 GJ	SW846 6020A <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	5670	6.1	mg/kg	5	01/23/12	01/24/12 JB	SW846 6010C <sup>2</sup>	SW846 3050B <sup>3</sup>

- (1) Instrument QC Batch: MA2134
- (2) Instrument QC Batch: MA2137
- (3) Prep QC Batch: MP6710
- (4) Prep QC Batch: MP6711

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 #
Accufest Quote #	Accufest Job # <b>D31246</b>

[illegible]

## D31246: Chain of Custody

Page 1 of 2

# Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D31246

Client: KRW CONSULTING

Immediate Client Services Action Required: No

Date / Time Received: 1/21/2012 9:35:00 AM

No. Coolers: 1

Client Service Action Required at Login: No

Project: XTO FRU 297-28C

Airbill #'s: Fedex

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

## Metals Analysis

5

### 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: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date: 01/23/12

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	0.050	<1.0
Beryllium	1.0	.044	.1		
Boron	5.0	.48	.48		
Cadmium	1.0	.027	.27		
Calcium	40	.96	1.1		
Chromium	1.0	.018	.031		
Cobalt	0.50	.035	.035		
Copper	1.0	.085	.16		
Iron	7.0	.34	2		
Lead	5.0	.16	.21		
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		
Phosphorus	10	1.1	1.2		
Potassium	200	5.5	9.2		
Selenium	5.0	.38	.5		
Silicon	5.0	.38	.51		
Silver	3.0	.018	.051		
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		

Associated samples MP6710: D31246-1, D31246-2

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

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

5.1.1

5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date: 01/23/12

Metal	D31167-1 Original MS	Spikelot MPICPALL % Rec	QC Limits
Aluminum			
Antimony			
Arsenic	anr		
Barium	4750 6110	223 608.9(a)	75-125
Beryllium			
Boron			
Cadmium	anr		
Calcium			
Chromium	anr		
Cobalt			
Copper	anr		
Iron			
Lead	anr		
Lithium			
Magnesium			
Manganese			
Molybdenum			
Nickel	anr		
Phosphorus			
Potassium			
Selenium	anr		
Silicon			
Silver	anr		
Sodium			
Strontium			
Thallium			
Tin			
Titanium			
Uranium			
Vanadium			
Zinc	anr		

Associated samples MP6710: D31246-1, D31246-2

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date: 01/23/12

Metal	D31167-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	4750	6260	239	630.6(a)	2.4	20
Beryllium						
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt						
Copper	anr					
Iron						
Lead	anr					
Lithium						
Magnesium						
Manganese						
Molybdenum						
Nickel	anr					
Phosphorus						
Potassium						
Selenium	anr					
Silicon						
Silver	anr					
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	anr					

Associated samples MP6710: D31246-1, D31246-2

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



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

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

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date: 01/23/12

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	199	200	99.5	80-120
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	anr			

Associated samples MP6710: D31246-1, D31246-2

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

5.1.3

5

SERIAL DILUTION RESULTS SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: ug/l

Prep Date: 01/23/12

Metal	D31167-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	37500	39700	6.7	0-10
Beryllium				
Boron				
Cadmium	anr			
Calcium				
Chromium	anr			
Cobalt				
Copper	anr			
Iron				
Lead	anr			
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	anr			
Phosphorus				
Potassium				
Selenium	anr			
Silicon				
Silver	anr			
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	anr			

Associated samples MP6710: D31246-1, D31246-2

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6710  
Matrix Type: SOLID

Methods: SW846 6010C  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

5.1.4

5

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6711  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 01/23/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.14	1.3		
Antimony	0.20	.001	.012		
Arsenic	0.40	.049	.1	0.16	<0.40
Barium	1.0	.0035	.025		
Beryllium	0.10	.0075	.055		
Boron	20	.97	.6		
Cadmium	0.050	.023	.034		
Calcium	200	1.8	9.5		
Chromium	1.0	.021	.041		
Cobalt	0.10	.0033	.0085		
Copper	1.0	.011	.055		
Iron	20	.81	18		
Lead	0.25	.0012	.023		
Magnesium	50	.067	.6		
Manganese	0.50	.007	.039		
Molybdenum	0.50	.0044	.025		
Nickel	1.0	.0029	.031		
Phosphorus	30	1.8	3.5		
Potassium	100	2	6		
Selenium	0.20	.075	.19		
Silver	0.050	.0008	.022		
Sodium	250	.8	3		
Strontium	10	.004	.024		
Thallium	0.10	.015	.013		
Tin	5.0	.006	.15		
Titanium	1.0	.035	.12		
Uranium	0.25	.00038	.008		
Vanadium	2.0	.052	.19		
Zinc	5.0	.039	.23		

Associated samples MP6711: D31246-1, D31246-2

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: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6711  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 01/23/12

Metal	D31167-1 Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	4.6	112	112	96.2	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 MP6711: D31246-1, D31246-2

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: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6711  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 01/23/12

Metal	D31167-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	4.6	119	120	95.5	6.1	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 MP6711: D31246-1, D31246-2

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: D31246  
Account: XTOKRWR - XTO Energy  
Project: FRU 297-28C

QC Batch ID: MP6711  
Matrix Type: SOLID

Methods: SW846 6020A  
Units: mg/kg

Prep Date: 01/23/12

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	106	100	106.0	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 MP6711: D31246-1, D31246-2

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

# SERIAL DILUTION RESULTS SUMMARY

Login Number: D31246  
 Account: XTOKRWR - XTO Energy  
 Project: FRU 297-28C

QC Batch ID: MP6711  
 Matrix Type: SOLID

Methods: SW846 6020A  
 Units: ug/l

Prep Date: 01/23/12

Metal	D31167-1 Original SDL 5:25 %DIF			QC Limits
Aluminum				
Antimony				
Arsenic	41.2	44.9	9.0	0-10
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP6711: D31246-1, D31246-2

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