

### Technical Report for

**Petron Development Co**

**Zuege Lease**

**SGS Accutest Job Number: D82441**

**Sampling Date: 05/03/16**

#### Report to:

**Petron Development Co  
1899 W. Littleton Blvd.  
Littleton, CO 80120  
jim@petron.net**

**ATTN: Jim Walker**

**Total number of pages in report: 27**



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

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

**Client Service contact: Cristina Araujo 303-425-6021**

Certifications: CO (CO00049), ID, NE (CO00049), ND (R-027), NJ (CO 0007), OK (D9942), UT (NELAP CO00049),  
LA (LA150028), TX (T104704511), WY  
CO (CO00049), EPA 515.4 Provisional

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Test results relate only to samples analyzed.

# Table of Contents

-1-

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

**Section 2: Summary of Hits ..... 4**

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

**3.1: D82441-1A: 1 ..... 6**

**3.2: D82441-2A: 2 ..... 8**

**3.3: D82441-3A: 3 ..... 10**

**3.4: D82441-4A: 4 ..... 12**

**Section 4: Misc. Forms ..... 14**

**4.1: Chain of Custody ..... 15**

**Section 5: Metals Analysis - QC Data Summaries ..... 17**

**5.1: Prep QC MP18682: Ca,Mg,Na,Sodium Adsorption Ratio ..... 18**



Sample Summary

Petron Development Co  
Zuege Lease

Job No: D82441

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
D82441-1A	05/03/16	14:55 TP	05/06/16	SO	Soil	1
D82441-2A	05/03/16	15:00 TP	05/06/16	SO	Soil	2
D82441-3A	05/03/16	15:05 TP	05/06/16	SO	Soil	3
D82441-4A	05/03/16	15:10 TP	05/06/16	SO	Soil	4

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

## Summary of Hits

Page 1 of 1

Job Number: D82441  
Account: Petron Development Co  
Project: Zuege Lease  
Collected: 05/03/16

2

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
D82441-1A	1					
Calcium		30.8	2.0		mg/l	SW846 6010C
Magnesium		5.41	1.0		mg/l	SW846 6010C
Sodium		25.1	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio <sup>a</sup>		1.10			ratio	USDA HANDBOOK 60
D82441-2A	2					
Calcium		32.9	2.0		mg/l	SW846 6010C
Magnesium		6.27	1.0		mg/l	SW846 6010C
Sodium		15.3	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio <sup>a</sup>		0.640			ratio	USDA HANDBOOK 60
D82441-3A	3					
Calcium		29.4	2.0		mg/l	SW846 6010C
Magnesium		4.66	1.0		mg/l	SW846 6010C
Sodium		98.4	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio <sup>a</sup>		4.45			ratio	USDA HANDBOOK 60
D82441-4A	4					
Calcium		24.1	2.0		mg/l	SW846 6010C
Magnesium		5.95	1.0		mg/l	SW846 6010C
Sodium		91.3	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio <sup>a</sup>		4.31			ratio	USDA HANDBOOK 60

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

## **Sample Results**

## **Report of Analysis**

Report of Analysis

Client Sample ID:	1	Date Sampled:	05/03/16
Lab Sample ID:	D82441-1A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	30.8	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Magnesium	5.41	1.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Sodium	25.1	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>

- (1) Instrument QC Batch: MA7305  
(2) Prep QC Batch: MP18682

RL = Reporting Limit

Report of Analysis

Client Sample ID:	1	Date Sampled:	05/03/16
Lab Sample ID:	D82441-1A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	1.10		ratio	1	05/11/16 12:59	AS	USDA HANDBOOK 60

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	2	Date Sampled:	05/03/16
Lab Sample ID:	D82441-2A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	32.9	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Magnesium	6.27	1.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Sodium	15.3	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>

- (1) Instrument QC Batch: MA7305  
(2) Prep QC Batch: MP18682

RL = Reporting Limit



Report of Analysis

Client Sample ID:	2	Date Sampled:	05/03/16
Lab Sample ID:	D82441-2A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	0.640		ratio	1	05/11/16 13:06	AS	USDA HANDBOOK 60

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

RL = Reporting Limit

## Report of Analysis

Client Sample ID:	3	Date Sampled:	05/03/16
Lab Sample ID:	D82441-3A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

## SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	29.4	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Magnesium	4.66	1.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Sodium	98.4	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>

(1) Instrument QC Batch: MA7305

(2) Prep QC Batch: MP18682

RL = Reporting Limit

Report of Analysis

Client Sample ID:	3	Date Sampled:	05/03/16
Lab Sample ID:	D82441-3A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	4.45		ratio	1	05/11/16 12:31	AS	USDA HANDBOOK 60

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

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4	Date Sampled:	05/03/16
Lab Sample ID:	D82441-4A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	24.1	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Magnesium	5.95	1.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>
Sodium	91.3	2.0	mg/l	1	05/10/16	05/11/16 AS	SW846 6010C <sup>1</sup>	SW846 3010A/M <sup>2</sup>

(1) Instrument QC Batch: MA7305  
(2) Prep QC Batch: MP18682

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4	Date Sampled:	05/03/16
Lab Sample ID:	D82441-4A	Date Received:	05/06/16
Matrix:	SO - Soil	Percent Solids:	n/a
Project:	Zuege Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	4.31		ratio	1	05/11/16 13:14	AS	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**

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**Includes the following where applicable:**

- Chain of Custody

4036 Youngfield Street, Wheat Ridge, CO 80033  
TEL: 303-425-6021 FAX: 303-425-6854  
[www.acupuncture.com](http://www.acupuncture.com)

[illegible]

## D82441: Chain of Custody

Page 1 of 2

## SGS Accutest Sample Receipt Summary

Job Number: D82441

Client: PETAOL DEVELOPMENT

Project: ZUEGE LEASE

Date / Time Received: 5/6/2016 3:10:00 PM

Delivery Method:

Airbill #'s: hd

Cooler Temps (Initial/Adjusted): #1: (17.2/17.2):

### Cooler Security

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: | IR Gun;                             |                          |
| 3. Cooler media:             | Ice (Bag)                           |                          |
| 4. No. Coolers:              | 1                                   |                          |

### 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"/> |

Comments

### 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"/> |

D82441: Chain of Custody

Page 2 of 2



**Metals Analysis**

5

**QC Data Summaries**

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**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: D82441  
Account: PETRCOL - Petron Development Co  
Project: Zuege Lease

QC Batch ID: MP18682  
Matrix Type: AQUEOUS

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

Prep Date: 05/10/16

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	55	65		
Antimony	150	11	44		
Arsenic	130	19	60		
Barium	50	1	2		
Beryllium	50	4.5	8		
Boron	250	4	18		
Cadmium	50	1	4		
Calcium	2000	12	50	52.0	<2000
Chromium	50	1.5	3.5		
Cobalt	25	2.5	6		
Copper	50	4	19		
Iron	350	7.5	35		
Lead	250	11	25		
Lithium	25	2	3.5		
Magnesium	1000	34	200	48.0	<1000
Manganese	25	2.5	4.5		
Molybdenum	50	2	18		
Nickel	150	2.5	14		
Phosphorus	500	75	170		
Potassium	5000	500	360		
Selenium	250	36	50		
Silicon	250	24	42		
Silver	150	1.5	3		
Sodium	2000	37	70	-82	<2000
Strontium	25	.05	1.5		
Thallium	50	9	40		
Tin	250	60	60		
Titanium	50	.5	14		
Uranium	250	15	22		
Vanadium	50	2	3		
Zinc	150	2	18		

Associated samples MP18682: D82441-1A, D82441-2A, D82441-3A, D82441-4A

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

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D82441  
Account: PETRCOL - Petron Development Co  
Project: Zuege Lease

QC Batch ID: MP18682  
Matrix Type: AQUEOUS

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

Prep Date: 05/10/16

Metal	RL	IDL	MDL	MB raw	final
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(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D82441  
 Account: PETRCOL - Petron Development Co  
 Project: Zuege Lease

QC Batch ID: MP18682  
 Matrix Type: AQUEOUS

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

Prep Date: 05/10/16

Metal	D82441-3A Original MS		Spikelot ICPAL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	29400	166000	125000	109.3	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	4660	134000	125000	103.5	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	98400	227000	125000	102.9	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP18682: D82441-1A, D82441-2A, D82441-3A, D82441-4A

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

## 5.1.2

QC Batch ID: MP18682  
Matrix Type: AQUEOUS

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

Prep Date: 05/10/16

Metal	D82441-3A Original MS	Spikelot ICPALL2 % Rec	QC Limits
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(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D82441  
 Account: PETRCOL - Petron Development Co  
 Project: Zuege Lease

QC Batch ID: MP18682  
 Matrix Type: AQUEOUS

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

Prep Date: 05/10/16

Metal	D82441-3A Original	MSD	Spikelot ICPAL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium	29400	165000	125000	108.5	0.6	20
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium						
Magnesium	4660	134000	125000	103.5	0.0	20
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silicon						
Silver						
Sodium	98400	225000	125000	101.3	0.9	20
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP18682: D82441-1A, D82441-2A, D82441-3A, D82441-4A

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

## 5.1.2

QC Batch ID: MP18682  
Matrix Type: AQUEOUS

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

05/10/16

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

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D82441

Account: PETRCOL - Petron Development Co

Project: Zuege Lease

QC Batch ID: MP18682

Methods: SW846 6010C, USDA HANDBOOK 60

Matrix Type: AQUEOUS

Units: ug/l

Prep Date:

05/10/16

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	137000	125000	109.6	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	130000	125000	104.0	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	127000	125000	101.6	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP18682: D82441-1A, D82441-2A, D82441-3A, D82441-4A

Results &lt; IDL are shown as zero for calculation purposes

(\*) Outside of QC limits



## 5.1.3

ת

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

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
-------	---------------	---------------------	-------	--------------

SERIAL DILUTION RESULTS SUMMARY

Login Number: D82441  
 Account: PETRCOL - Petron Development Co  
 Project: Zuege Lease

QC Batch ID: MP18682  
 Matrix Type: AQUEOUS

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

Prep Date: 05/10/16

D82441-3A		QC		
Metal	Original	SDL 1:5	%DIF	Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	5870	5880	0.1	0-10
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	932	920	1.3	0-10
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	19700	19600	0.5	0-10
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP18682: D82441-1A, D82441-2A, D82441-3A, D82441-4A

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: D82441  
Account: PETRCOL - Petron Development Co  
Project: Zuege Lease

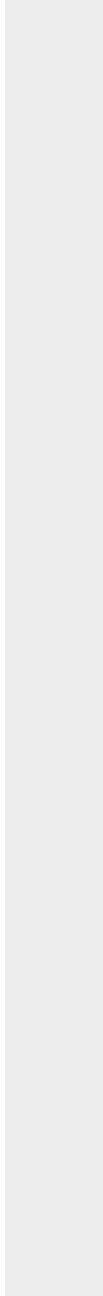
QC Batch ID: MP18682  
Matrix Type: AQUEOUS

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

Prep Date: 05/10/16

	D82441-3A		QC
Metal	Original SDL 1:5	%DIF	Limits

(anr) Analyte not requested



5.1.4

5