

PDC Energy, Inc.
Third Quarter 2015 Groundwater Monitoring Summary

October 1, 2015

Steinwald 1 Tank Battery
NWNW S3 T1N R64W
Weld County, API # 05-123-10892
Spill Tracking # 400615494
Remediation # 8954

This groundwater summary has been prepared by Tasman Geosciences, Inc. for the Steinwald 1 tank battery. On August 6, 2015, groundwater sampling was conducted at five monitoring well locations at the site. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B. Groundwater analytical data is summarized in Table 1 below and the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Third quarter 2015 analytical results indicate benzene concentrations are in exceedance of applicable COGCC Table 910-1 standard in four monitoring well locations (BH01, BH02, BH03, and BH04). BTEX concentrations are below regulatory standards in the remaining sample location (BH05).

Monitored natural attenuation will remain the selected remedial strategy through the fourth quarter 2015. Additional remedial strategies are being evaluated to address persisting dissolved phase hydrocarbon concentrations on site.

Fourth quarter 2015 groundwater sampling will be conducted during November 2015.

TABLE 1
STEINWALD #1 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH01	10/20/2014	4.6	15	<1.0	9.2	67.08
BH01	2/23/2015	95	3.9	<1.0	5.1	66.90
BH01	5/14/2015	81	<1.0	<1.0	<1.0	66.56
BH01	8/6/2015	160	<1.0	<1.0	2.2	66.53
BH02	10/20/2014	<1.0	<1.0	<1.0	<1.0	68.90
BH02	2/23/2015	<1.0	<1.0	<1.0	<1.0	68.61
BH02	5/14/2015	5.2	<1.0	<1.0	<1.0	68.30
BH02	8/6/2015	6.9	<1.0	<1.0	<1.0	68.29
BH03	10/20/2014	<1.0	2.7	<1.0	5.7	63.86
BH03	2/23/2015	<1.0	<1.0	<1.0	<1.0	63.29
BH03	5/14/2015	6.1	<1.0	<1.0	<1.0	63.41
BH03	8/6/2015	10	<1.0	<1.0	<1.0	63.39
BH04	10/20/2014	130	670	29	390	66.58
BH04	10/23/2014	110	320	11	260	66.16
BH04	2/23/2015	260	8.2	<1.0	100	66.32
BH04	5/14/2015	500	10	2.3	41	66.00
BH04	8/6/2015	300	6.1	1.7	47	65.99
BH05	11/26/2014	<1.0	<1.0	<1.0	<1.0	65.68
BH05	2/23/2015	<1.0	<1.0	<1.0	<1.0	65.88
BH05	5/14/2015	<1.0	<1.0	<1.0	<1.0	65.52
BH05	8/6/2015	<1.0	<1.0	<1.0	<1.0	65.56

Notes:

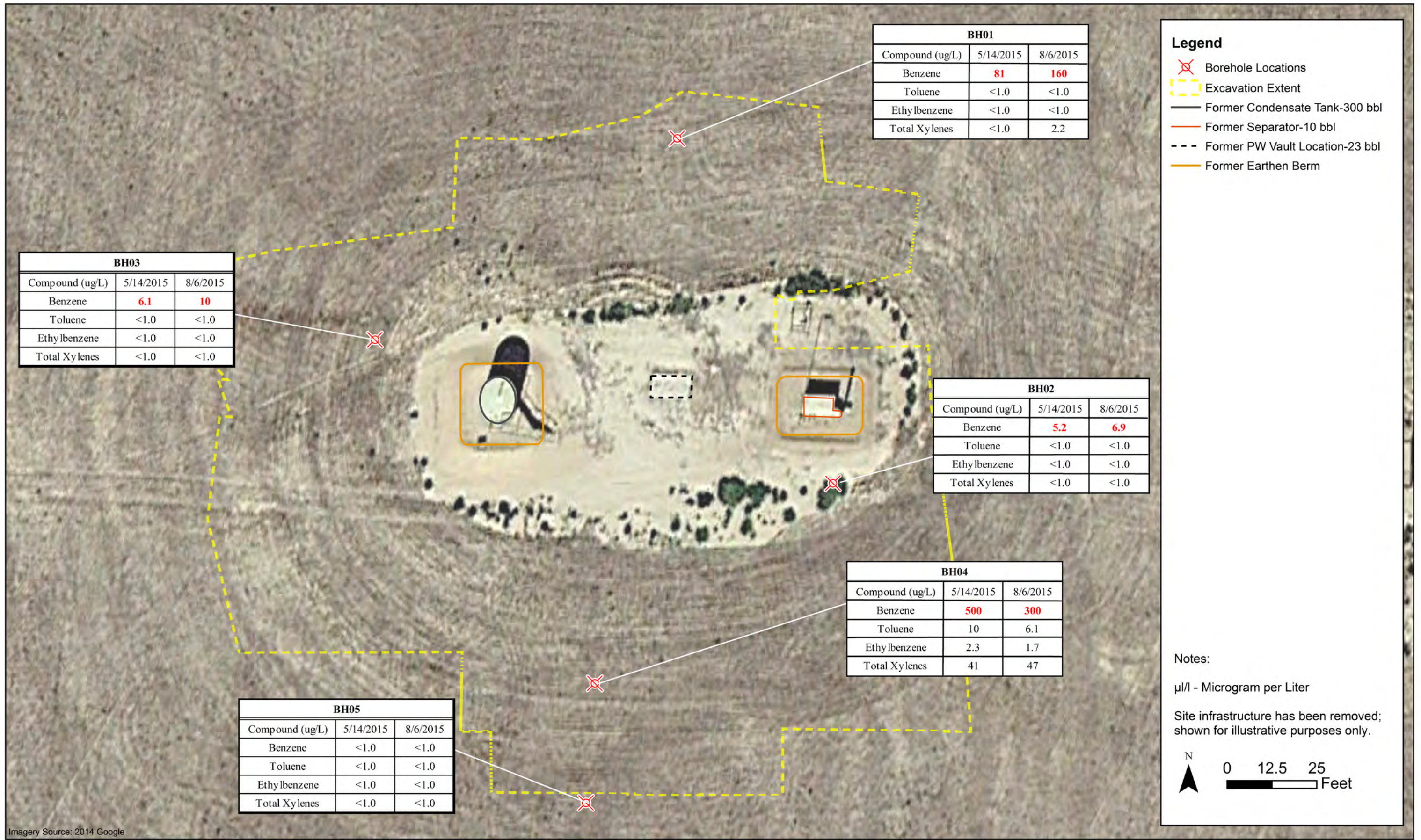
1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective February 1, 2014.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

(<) = Analytical result is less than the indicated laboratory reporting limit.

BOLD = Analytical result is in exceedance of COGCC groundwater standards.



DATE: September 2015
 DESIGNED BY: C. Wasko
 DRAWN BY: D. Arnold



PDC Energy
Steinwald #1 Tank Battery
 NWNW Section 3, Township 1 North, Range 64 West
 Weld County, Colorado

Groundwater Analytical
 Results Map

Figure
 1

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

August 13, 2015

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Steinwald #1

Enclosed are the results of analyses for samples received by Summit Scientific on 08/06/15 17:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury
President



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
08/13/15 08:08

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1508054-01	Water	08/06/15 11:46	08/06/15 17:00
BH02	1508054-02	Water	08/06/15 11:33	08/06/15 17:00
BH03	1508054-03	Water	08/06/15 11:32	08/06/15 17:00
BH04	1508054-04	Water	08/06/15 11:13	08/06/15 17:00
BH05	1508054-05	Water	08/06/15 11:12	08/06/15 17:00

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PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 08/13/15 08:08

BH01
1508054-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/06/15 11:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	160	1.0	ug/l	1	1508081	08/11/15	08/11/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	2.2	1.0	"	"	"	"	"	"	

Date Sampled: **08/06/15 11:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		111 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.6 %	45-146		"	"	"	"	

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PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 08/13/15 08:08

BH02
1508054-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/06/15 11:33**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	6.9	1.0	ug/l	1	1508081	08/11/15	08/11/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **08/06/15 11:33**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		103 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.9 %	45-146		"	"	"	"	

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PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 08/13/15 08:08

BH03
1508054-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/06/15 11:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	10	1.0	ug/l	1	1508081	08/11/15	08/11/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **08/06/15 11:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		105 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		94.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.1 %	45-146		"	"	"	"	

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PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 08/13/15 08:08

BH04
1508054-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/06/15 11:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	300	1.0	ug/l	1	1508081	08/11/15	08/11/15	EPA 8260B	
Toluene	6.1	1.0	"	"	"	"	"	"	
Ethylbenzene	1.7	1.0	"	"	"	"	"	"	
Xylenes (total)	47	1.0	"	"	"	"	"	"	

Date Sampled: **08/06/15 11:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		99.8 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.9 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.6 %	45-146		"	"	"	"	

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PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 08/13/15 08:08

BH05
1508054-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/06/15 11:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1508081	08/11/15	08/11/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **08/06/15 11:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>101 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>92.1 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>100 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
08/13/15 08:08

Volatile Organic Compounds by EPA Method 8260B - Quality Control

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Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 1508081 - EPA 5030 Water MS

Blank (1508081-BLK1)

Prepared & Analyzed: 08/11/15

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.2		99.7	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		95.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		97.0	45-146			

LCS (1508081-BS1)

Prepared & Analyzed: 08/11/15

Benzene	39.9	1.0	ug/l	33.3		120	51-132			
Toluene	40.1	1.0	"	33.3		120	51-138			
Ethylbenzene	42.8	1.0	"	33.1		130	58-146			
m,p-Xylene	89.2	2.0	"	66.5		134	57-144			
o-Xylene	43.3	1.0	"	32.8		132	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.4		"	13.2		102	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		98.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.6	45-146			

Matrix Spike (1508081-MS1)

Source: 1508054-01

Prepared & Analyzed: 08/11/15

Benzene	191	1.0	ug/l	33.3	165	79.1	34-141			
Toluene	42.2	1.0	"	33.3	ND	126	27-151			
Ethylbenzene	43.9	1.0	"	33.1	ND	133	29-160			
m,p-Xylene	91.6	2.0	"	66.5	ND	138	20-166			
o-Xylene	46.2	1.0	"	32.8	2.16	134	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.2		110	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		93.4	45-146			

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 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 08/13/15 08:08

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source	%REC			RPD	Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 1508081 - EPA 5030 Water MS

Matrix Spike Dup (1508081-MSD1)	Source: 1508054-01			Prepared & Analyzed: 08/11/15						
Benzene	180	1.0	ug/l	33.3	165	46.7	34-141	5.82	32	
Toluene	41.5	1.0	"	33.3	ND	124	27-151	1.58	25	
Ethylbenzene	44.8	1.0	"	33.1	ND	135	29-160	1.89	50	
m,p-Xylene	93.1	2.0	"	66.5	ND	140	20-166	1.61	36	
o-Xylene	47.5	1.0	"	32.8	2.16	138	33-159	2.88	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.1</i>		<i>"</i>	<i>13.2</i>		<i>107</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.9</i>		<i>"</i>	<i>13.3</i>		<i>97.1</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.9</i>		<i>"</i>	<i>13.3</i>		<i>97.0</i>	<i>45-146</i>			

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Denver CO, 80203

Project: Steinwald #1

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
08/13/15 08:08

Notes and Definitions

DET Analyte DETECTED
ND Analyte NOT DETECTED at or above the reporting limit
NR Not Reported
dry Sample results reported on a dry weight basis
RPD Relative Percent Difference

Summit Scientific

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