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[www.greenanalytical.com](http://www.greenanalytical.com)

20 October 2016

Andy Hawk  
BP America  
380 Airport Rd.  
Durango, CO 81303  
RE: Table 910

Enclosed are the results of analyses for samples received by the laboratory on 10/07/16 12:45.  
If you need any further assistance, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads 'Debbie Zufelt'.

Debbie Zufelt  
Reports Manager

All accredited analytes contained in this report are denoted by an asterisk (\*). For a complete list of accredited analytes please do not hesitate to contact us via any of the contact information contained in this report. All of our certifications can be viewed at <http://greenanalytical.com/certifications/>

Green Analytical Laboratories is NELAP accredited through the Texas Commission on Environmental Quality. Accreditation applies to drinking water and non-potable water matrices for trace metals and a variety of inorganic parameters. Green Analytical Laboratories is also accredited through the Colorado Department of Public Health and Environment and EPA region 8 for trace metals, Cyanide, Fluoride, Nitrate, and Nitrite in drinking water.

Our affiliate laboratory, Cardinal Laboratories, is also NELAP accredited through the Texas Commission on Environmental Quality for a variety of organic constituents in drinking water, non-potable water and solid matrices. Cardinal is also accredited for regulated VOCs, TTHM, and HAA-5 in drinking water through the Colorado Department of Public Health and Environment and EPA region 8.



BP America  
380 Airport Rd.  
Durango CO, 81303

Project: Table 910  
Project Name / Number: Perino WTS  
Project Manager: Andy Hawk

**Reported:**  
10/20/16 14:39

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS04	1610055-01	Solid	10/07/16 08:15	10/07/16 12:45
SS05	1610055-02	Solid	10/07/16 08:20	10/07/16 12:45

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Debbie Zufelt, Reports Manager

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BP America  
380 Airport Rd.  
Durango CO, 81303Project: Table 910  
Project Name / Number: Perino WTS  
Project Manager: Andy HawkReported:  
10/20/16 14:39

## SS04

## 1610055-01 (Solid)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
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## General Chemistry

% Dry Solids	85.2			%	1	10/13/16	EPA160.3/1684		BDV
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## Saturated Paste Extraction

Calcium	82.0	0.250	0.014	mg/L	5	10/18/16	EPA200.7		LLG
Conductivity	2180			umhos/cm	1	10/18/16	ASA#9 10-3.3		BDV
Magnesium	14.7	5.00	0.095	mg/L	5	10/18/16	EPA200.7		LLG
pH	7.95			pH Units	1	10/18/16	ASA#9 12-2.6		BDV
SAR	9.57			No Unit	1	10/18/16	Calculation		LLG
Sodium	358	10.0	0.020	mg/L	5	10/18/16	EPA200.7		LLG

## Total Metals by ICP

Barium	343	5.00	2.89	mg/kg dry	100	10/19/16	6010B		LLG
Cadmium	<5.00	5.00	0.722	mg/kg dry	100	10/19/16	6010B		LLG
Chromium	9.86	5.00	0.240	mg/kg dry	100	10/19/16	6010B		LLG
Copper	14.8	5.00	4.41	mg/kg dry	100	10/19/16	6010B		LLG
Lead	18.5	10.0	1.70	mg/kg dry	100	10/19/16	6010B		LLG
Nickel	13.4	5.00	0.621	mg/kg dry	100	10/19/16	6010B		LLG
Selenium	<20.0	20.0	8.16	mg/kg dry	100	10/19/16	6010B		LLG
Silver	<5.00	5.00	0.231	mg/kg dry	100	10/19/16	6010B		LLG
Zinc	67.0	5.00	2.40	mg/kg dry	100	10/19/16	6010B		LLG

## Dissolved Metals by ICP

Boron	<0.600	0.600	0.105	mg/L	2	10/18/16	EPA200.7		LLG
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## Total Metals by ICPMS

Arsenic	3.91	1.00	0.460	mg/kg dry	1000	10/14/16	6020A		LLG
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10/20/16 14:39

## SS04

## 1610055-01 (Solid)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
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## Total Mercury by CVAA

Mercury	<0.117	0.117	0.0147	mg/kg dry	500	10/12/16	EPA7471		LLG
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Subcontracted -- Cardinal Laboratories

## Volatile Organic Compounds by EPA Method 8021

Benzene*	<0.050	0.050	0.002	mg/kg	50	10/12/16	8021B		CK
Toluene*	0.512	0.050	0.002	mg/kg	50	10/12/16	8021B		CK
Ethylbenzene*	<0.050	0.050	0.004	mg/kg	50	10/12/16	8021B		CK
Total Xylenes*	<0.150	0.150	0.010	mg/kg	50	10/12/16	8021B		CK
Total BTEX	0.512	0.300	0.018	mg/kg	50	10/12/16	8021B		CK

Surrogate: 4-Bromofluorobenzene (PID)	99.9 %	73.6-140		10/12/16	8021B	CK
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## Petroleum Hydrocarbons by GC FID

GRO C6-C10	<10.0	10.0	3.53	mg/kg	1	10/12/16	8015B		CK
DRO >C10-C28	<10.0	10.0	2.04	mg/kg	1	10/12/16	8015B		CK
EXT DRO >C28-C35	<10.0	10.0	2.04	mg/kg	1	10/12/16	8015B		CK

Surrogate: 1-Chlorooctane	74.4 %	35-147		10/12/16	8015B	CK
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Surrogate: 1-Chlorooctadecane	88.0 %	28-171		10/12/16	8015B	CK
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Project Name / Number: Perino WTS  
Project Manager: Andy HawkReported:  
10/20/16 14:39

## SS05

## 1610055-02 (Solid)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
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## General Chemistry

% Dry Solids	86.9			%	1	10/13/16	EPA160.3/1684		BDV
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## Saturated Paste Extraction

Calcium	69.0	0.250	0.014	mg/L	5	10/18/16	EPA200.7		LLG
Conductivity	1410			umhos/cm	1	10/18/16	ASA#9 10-3.3		BDV
Magnesium	11.7	5.00	0.095	mg/L	5	10/18/16	EPA200.7		LLG
pH	8.18			pH Units	1	10/18/16	ASA#9 12-2.6		BDV
SAR	6.71			No Unit	1	10/18/16	Calculation		LLG
Sodium	229	10.0	0.020	mg/L	5	10/18/16	EPA200.7		LLG

## Total Metals by ICP

Barium	310	5.00	2.89	mg/kg dry	100	10/19/16	6010B		LLG
Cadmium	<5.00	5.00	0.722	mg/kg dry	100	10/19/16	6010B		LLG
Chromium	9.66	5.00	0.240	mg/kg dry	100	10/19/16	6010B		LLG
Copper	12.3	5.00	4.41	mg/kg dry	100	10/19/16	6010B		LLG
Lead	16.5	10.0	1.70	mg/kg dry	100	10/19/16	6010B		LLG
Nickel	11.9	5.00	0.621	mg/kg dry	100	10/19/16	6010B		LLG
Selenium	<20.0	20.0	8.16	mg/kg dry	100	10/19/16	6010B		LLG
Silver	<5.00	5.00	0.231	mg/kg dry	100	10/19/16	6010B		LLG
Zinc	56.9	5.00	2.40	mg/kg dry	100	10/19/16	6010B		LLG

## Dissolved Metals by ICP

Boron	<0.600	0.600	0.105	mg/L	2	10/18/16	EPA200.7		LLG
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## Total Metals by ICPMS

Arsenic	3.98	1.00	0.460	mg/kg dry	1000	10/14/16	6020A		LLG
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Project: Table 910  
Project Name / Number: Perino WTS  
Project Manager: Andy Hawk

Reported:  
10/20/16 14:39

**SS05****1610055-02 (Solid)**

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
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**Total Mercury by CVAA**

Mercury	<0.115	0.115	0.0144	mg/kg dry	500	10/12/16	EPA7471		LLG
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Subcontracted -- Cardinal Laboratories

**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050	0.050	0.002	mg/kg	50	10/12/16	8021B		CK
Toluene*	<b>0.548</b>	0.050	0.002	mg/kg	50	10/12/16	8021B		CK
Ethylbenzene*	<0.050	0.050	0.004	mg/kg	50	10/12/16	8021B		CK
Total Xylenes*	<0.150	0.150	0.010	mg/kg	50	10/12/16	8021B		CK
Total BTEX	<b>0.548</b>	0.300	0.018	mg/kg	50	10/12/16	8021B		CK

Surrogate: 4-Bromofluorobenzene (PID) 99.5 % 73.6-140 10/12/16 8021B CK

**Petroleum Hydrocarbons by GC FID**

GRO C6-C10	<10.0	10.0	3.53	mg/kg	1	10/12/16	8015B		CK
DRO >C10-C28	<10.0	10.0	2.04	mg/kg	1	10/12/16	8015B		CK
EXT DRO >C28-C35	<10.0	10.0	2.04	mg/kg	1	10/12/16	8015B		CK

Surrogate: 1-Chlorooctane 103 % 35-147 10/12/16 8015B CK

Surrogate: 1-Chlorooctadecane 111 % 28-171 10/12/16 8015B CK

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Project: Table 910  
Project Name / Number: Perino WTS  
Project Manager: Andy Hawk

Reported:  
10/20/16 14:39

### General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch B610102 - General Prep - Wet Chem

Duplicate (B610102-DUP1) Source: 1610081-01 Prepared & Analyzed: 10/13/16

% Dry Solids	75.9		%		77.2			1.70	20	
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### Saturated Paste Extraction - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch B610131 - Paste Extract

Blank (B610131-BLK1) Prepared & Analyzed: 10/18/16

Calcium	ND	0.050	mg/L							
Magnesium	ND	1.00	mg/L							
Sodium	ND	2.00	mg/L							

Duplicate (B610131-DUP1) Source: 1610057-02 Prepared & Analyzed: 10/18/16

Calcium	32.4	0.250	mg/L		26.6			19.7	20	
Magnesium	6.61	5.00	mg/L		5.03			27.1	20	R2
SAR	51.1		No Unit		46.3			9.89	20	
Sodium	1220	10.0	mg/L		992			20.4	20	R1

#### Batch B610136 - General Prep - Wet Chem

Duplicate (B610136-DUP1) Source: 1610057-02 Prepared & Analyzed: 10/18/16

Conductivity	4620		umhos/cm		4610			0.217	20	
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#### Batch B610137 - General Prep - Wet Chem

Duplicate (B610137-DUP1) Source: 1610057-02 Prepared & Analyzed: 10/18/16

pH	9.13		pH Units		9.08			0.549	20	
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380 Airport Rd.  
Durango CO, 81303

Project: Table 910  
Project Name / Number: Perino WTS  
Project Manager: Andy Hawk

Reported:  
10/20/16 14:39

### Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch B610147 - EPA 3050

##### Blank (B610147-BLK1)

Prepared &amp; Analyzed: 10/19/16

Barium	ND	0.050	mg/kg dry
Cadmium	ND	0.050	mg/kg dry
Chromium	ND	0.050	mg/kg dry
Copper	ND	0.050	mg/kg dry
Lead	ND	0.100	mg/kg dry
Nickel	ND	0.050	mg/kg dry
Selenium	ND	0.200	mg/kg dry
Silver	ND	0.050	mg/kg dry
Zinc	ND	0.050	mg/kg dry

##### LCS (B610147-BS1)

Prepared &amp; Analyzed: 10/19/16

Barium	1.97	0.050	mg/kg dry	2.00	98.3	85-115
Cadmium	1.96	0.050	mg/kg dry	2.00	98.0	85-115
Chromium	2.04	0.050	mg/kg dry	2.00	102	85-115
Copper	3.93	0.050	mg/kg dry	4.00	98.2	85-115
Lead	1.94	0.100	mg/kg dry	2.00	97.2	85-115
Nickel	1.99	0.050	mg/kg dry	2.00	99.4	85-115
Selenium	8.38	0.200	mg/kg dry	8.00	105	85-115
Silver	0.091	0.050	mg/kg dry	0.100	91.3	85-115
Zinc	1.91	0.050	mg/kg dry	2.00	95.4	85-115

##### LCS Dup (B610147-BSD1)

Prepared &amp; Analyzed: 10/19/16

Barium	1.93	0.050	mg/kg dry	2.00	96.6	85-115	1.76	20
Cadmium	1.91	0.050	mg/kg dry	2.00	95.6	85-115	2.52	20
Chromium	1.99	0.050	mg/kg dry	2.00	99.4	85-115	2.55	20
Copper	3.85	0.050	mg/kg dry	4.00	96.4	85-115	1.85	20
Lead	1.94	0.100	mg/kg dry	2.00	97.1	85-115	0.103	20
Nickel	1.97	0.050	mg/kg dry	2.00	98.4	85-115	1.00	20
Selenium	8.26	0.200	mg/kg dry	8.00	103	85-115	1.50	20
Silver	0.090	0.050	mg/kg dry	0.100	90.0	85-115	1.44	20
Zinc	1.89	0.050	mg/kg dry	2.00	94.5	85-115	0.981	20

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Project Name / Number: Perino WTS  
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## Dissolved Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Batch B610132 - Hot Water Soluble Metals Extract

## Blank (B610132-BLK1)

Prepared &amp; Analyzed: 10/18/16

Boron ND 0.600 mg/L

## Duplicate (B610132-DUP1)

Source: 1610057-02

Prepared &amp; Analyzed: 10/18/16

Boron 0.758 0.600 mg/L 0.866 13.4 20

## Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Batch B610105 - EPA 3050M

## Blank (B610105-BLK1)

Prepared &amp; Analyzed: 10/14/16

Arsenic ND 0.0010 mg/kg dry

## LCS (B610105-BS1)

Prepared &amp; Analyzed: 10/14/16

Arsenic 0.0589 0.0010 mg/kg dry 0.0500 118 80-120

## LCS Dup (B610105-BSD1)

Prepared &amp; Analyzed: 10/14/16

Arsenic 0.0561 0.0010 mg/kg dry 0.0500 112 80-120 4.81 20

## Total Mercury by CVAA - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Batch B610090 - EPA 245.1/7470

## Blank (B610090-BLK1)

Prepared &amp; Analyzed: 10/12/16

Mercury ND 0.0002 mg/kg wet

## LCS (B610090-BS1)

Prepared &amp; Analyzed: 10/12/16

Mercury 0.0018 0.0002 mg/kg wet 0.00200 88.5 85-115

## LCS Dup (B610090-BSD1)

Prepared &amp; Analyzed: 10/12/16

Mercury 0.0019 0.0002 mg/kg wet 0.00200 94.5 85-115 6.55 20

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## Volatile Organic Compounds by EPA Method 8021 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Batch 6101104 - Volatiles

## Blank (6101104-BLK1)

Prepared: 10/11/16 Analyzed: 10/12/16

Surrogate: 4-Bromofluorobenzene (PID)	ND		mg/kg	0.0500		99.9	73.6-140			
Benzene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Total BTEX	ND	0.300	mg/kg							
Total Xylenes	ND	0.150	mg/kg							

## LCS (6101104-BS1)

Prepared: 10/11/16 Analyzed: 10/12/16

Surrogate: 4-Bromofluorobenzene (PID)	0.0495		mg/kg	0.0500		99.0	73.6-140			
Benzene	2.15	0.050	mg/kg	2.00		107	82.6-122			
Ethylbenzene	2.15	0.050	mg/kg	2.00		108	65.4-131			
Toluene	2.21	0.050	mg/kg	2.00		111	72.9-122			
Total Xylenes	6.47	0.150	mg/kg	6.00		108	73.8-125			

## LCS Dup (6101104-BSD1)

Prepared: 10/11/16 Analyzed: 10/12/16

Surrogate: 4-Bromofluorobenzene (PID)	0.0496		mg/kg	0.0500		99.2	73.6-140			
Benzene	2.20	0.050	mg/kg	2.00		110	82.6-122	2.56	8.23	
Ethylbenzene	2.21	0.050	mg/kg	2.00		111	65.4-131	2.86	9.46	
Toluene	2.28	0.050	mg/kg	2.00		114	72.9-122	2.87	8.71	
Total Xylenes	6.68	0.150	mg/kg	6.00		111	73.8-125	3.14	8.66	

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Project Name / Number: Perino WTS  
Project Manager: Andy Hawk

Reported:  
10/20/16 14:39

### Petroleum Hydrocarbons by GC FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 6101105 - General Prep - Organics

##### Blank (6101105-BLK1)

Prepared: 10/11/16 Analyzed: 10/12/16

Surrogate: 1-Chlorooctadecane	55.0		mg/kg	50.0		110	28-171			
Surrogate: 1-Chlorooctane	55.2		mg/kg	50.0		110	35-147			
DRO >C10-C28	ND	10.0	mg/kg							
EXT DRO >C28-C35	ND	10.0	mg/kg							
GRO C6-C10	ND	10.0	mg/kg							
Total TPH C6-C28	ND	10.0	mg/kg							

##### LCS (6101105-BS1)

Prepared: 10/11/16 Analyzed: 10/12/16

Surrogate: 1-Chlorooctadecane	57.8		mg/kg	50.0		116	28-171			
Surrogate: 1-Chlorooctane	61.3		mg/kg	50.0		123	35-147			
DRO >C10-C28	203	10.0	mg/kg	200		101	78.3-122			
GRO C6-C10	203	10.0	mg/kg	200		102	76.7-115			
Total TPH C6-C28	406	10.0	mg/kg	400		101	79.8-117			

##### LCS Dup (6101105-BSD1)

Prepared: 10/11/16 Analyzed: 10/12/16

Surrogate: 1-Chlorooctadecane	58.1		mg/kg	50.0		116	28-171			
Surrogate: 1-Chlorooctane	56.0		mg/kg	50.0		112	35-147			
DRO >C10-C28	190	10.0	mg/kg	200		95.0	78.3-122	6.47	13.2	
GRO C6-C10	177	10.0	mg/kg	200		88.4	76.7-115	13.9	9.42	QR-02
Total TPH C6-C28	367	10.0	mg/kg	400		91.7	79.8-117	10.1	10.7	

Green Analytical Laboratories

Debbie Zufelt, Reports Manager

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BP America  
380 Airport Rd.  
Durango CO, 81303

Project: Table 910  
Project Name / Number: Perino WTS  
Project Manager: Andy Hawk

Reported:  
10/20/16 14:39

### Notes and Definitions

R2 Duplicate sample RPD exceeded the method control limit. One or more of the duplicates was less than 5X reporting limit so RPD requirements do not apply.

R1 Duplicate sample RPD exceeded laboratory acceptance criteria. Sample(s) may be difficult to homogenize.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

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  
\*Results reported on as received basis unless designated as dry.

RPD Relative Percent Difference

LCS Laboratory Control Sample (Blank Spike)

RL Report Limit

MDL Method Detection Limit

Green Analytical Laboratories

Debbie Zufelt, Reports Manager

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Fax: (970) 247-4227

service@greenanalytical.com or dzufelt@greenanalytical.com  
75 Suttle St Durango, CO 81303

# CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name (if Applicable): BP America Prod Co

Contact Person: Andrew Hawk

Address: 380 Airport Road

City: Durango

State: CO Zip: 81303

Phone #: 970-375-7590

Email: andrew.hawk@bp.com

Project Name (optional): Perma WTS

Project Number (optional):

Sampler Name (Print): Andrew Hawk

Bill to (if different):

P.O. #: UHAWKAGENV

Company:

Attn:

Address:

City:

State:

Zip:

Phone #:

Email:

For Lab Use

Sample Name or Location

11610-055-1

SSC4  
SSO5

Date

Time

10/7/16 8:15  
10/7/16 8:20

Collected

Matrix (check one)

# of containers

GROUNDWATER  
SURFACEWATER  
WASTEWATER  
PRODUCEDWATER  
SOIL  
DRINKING WATER  
OTHER:

No preservation (general)  
HNO<sub>3</sub>  
HCl  
H<sub>2</sub>SO<sub>4</sub>  
Other:  
Other:

X  
X

X

X

Table 910-1 less PAH

ANALYSIS REQUEST

PLEASE NOTE: GAL's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by GAL within 30 days after completion. In no event shall GAL be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by GAL, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:

Date: 10/7/16  
Time: 12:45

Received By:

Michael Valentine

Relinquished By:

Date:

Received By:

Relinquished By:

Date:

Received By:

Delivered By: (Circle One)

Temperature at receipt:

CHECKED BY:

Sampler - UPS - FedEx - Kangaroo - Other:

10.7 °C

MV

Report to State? (Circle)

Yes

No

\* Chain of Custody must be signed in "Relinquished By:" as an acceptance of services and all applicable charges.