02231317

Form 19

Page 1

FORM 4 Rev 12/05

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)894-2100 Fax:(303)894-2109

RECEIVED
DEC 3 - 2012
COGCC

SUNDRY NOTICE

Submit original plus one copy. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form.) Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b.)

lease

1. OGCC Operator Number: 10079		4. Contact Name: Cole Kilstrom	Complete the Attachment Checklist
2. Name of Operator: Antero Resources Piceance Corporation		Phone: 303-357-6709	
3. Address: 1625 17th St STE 300 ATTN: Cole Kilstrom		Fax: 303-357-7315	OP OGCC
City: Denver	State: CO	Zip: 80202	
5. API Number 05- 045-13935	OGCC Facility ID Number 289963		Survey Plat
6. Well/Facility Name: Robinson A Pad	7. Well/Facility Number A3		Directional Survey
8. Location (QtrQtr, Sec, Twp, Rng, Meridian): SWSW 8 6S 92W 6			Surface Eqpmt Diagram
9. County: Garfield	10. Field Name: Mamm Creek		Technical Info Page X
11. Federal, Indian or State Lease Number:			Other

ation ID 36015

General Notice

☐ CHANGE OF LOCATION: Attach New Survey Plat (a change of surface qtr/qtr is substantive and requires a new permit)

	FNL/FSL		FEL/FWL	
Change of Surface Footage from Exterior Section Lines:				
Change of Surface Footage to Exterior Section Lines:				
Change of Bottomhole Footage from Exterior Section Lines:				
Change of Bottomhole Footage to Exterior Section Lines:				attach directional survey

Bottomhole location Qtr/Qtr, Sec, Twp, Rng, Mer

Latitude | Distance to nearest property line | Distance to nearest bldg, public rd, utility or RR

Longitude | Distance to nearest lease line | Is location in a High Density Area (rule 603b)? Yes/No

Ground Elevation | Distance to nearest well same formation | Surface owner consultation date:

GPS DATA:
Date of Measurement | PDOP Reading | Instrument Operator's Name

☐ CHANGE SPACING UNIT
Formation | Formation Code | Spacing order number | Unit Acreage | Unit configuration

☐ Remove from surface bond
Signed surface use agreement attached

☐ CHANGE OF OPERATOR (prior to drilling):
Effective Date:
Plugging Bond: ☐ Blanket ☐ Individual

☐ CHANGE WELL NAME NUMBER
From:
To:
Effective Date:

☐ ABANDONED LOCATION:
Was location ever built? ☐ Yes ☐ No
Is site ready for inspection? ☐ Yes ☐ No
Date Ready for Inspection:

☐ NOTICE OF CONTINUED SHUT IN STATUS
Date well shut in or temporarily abandoned:
Has Production Equipment been removed from site? ☐ Yes ☐ No
MIT required if shut in longer than two years. Date of last MIT

☐ SPUD DATE:

☐ REQUEST FOR CONFIDENTIAL STATUS (6 mos from date casing set)

☐ SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK *submit cbl and cement job summaries
Method used | Cementing tool setting/perf depth | Cement volume | Cement top | Cement bottom | Date

☐ RECLAMATION: Attach technical page describing final reclamation procedures per Rule 1004.
Final reclamation will commence on approximately ☐ Final reclamation is completed and site is ready for inspection.

Technical Engineering/Environmental Notice

☐ Notice of Intent Approximate Start Date:
☐ Report of Work Done Date Work Completed:

Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)

☐ Intent to Recomplete (submit form 2)	☐ Request to Vent or Flare	☐ E&P Waste Disposal
☐ Change Drilling Plans	☐ Repair Well	☐ Beneficial Reuse of E&P Waste
☐ Gross Interval Changed?	☐ Rule 502 variance requested	☒ Status Update/Change of Remediation Plans for Spills and Releases
☐ Casing/Cementing Program Change	☐ Other:	

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: [signature] Date: 11/29/12 Email: ckilstrom@anteroresources.com

Print Name: Cole Kilstrom Title: ENV Specialist

COGCC Approved: [signature] Title: Env. Supv Date: 12/18/17

CONDITIONS OF APPROVAL, IF ANY:

See Attached Conditions of Approval

- Provide number and locations of pot holes, depth of pot holes, and quantity of confirmation samples.
- Provide volume impacted material and haul tickets for the material being disposed of at the South Canyon land fill.

- Provide information on how the 4000 +/- ft^2 aerial ex tent and vertical extent of impacted area was characterized
- Provide location of Background samples collected

FORM 4 Rev 12/05

Page 2

TECHNICAL INFORMATION PAGE

FOR OGCC USE ONLY

RECEIVED
DEC 3 - 2012
COGCC

1. OGCC Operator Number: 10079 API Number: 05-045-13935
2. Name of Operator: Antero Resources Piceance Corp. OGCC Facility ID # 289963
3. Well/Facility Name: Robinson A Pad Well/Facility Number: A3
4. Location (QtrQtr, Sec, Twp, Rng, Meridian): SWSW 8 6S 92W 6

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. **DESCRIBE PROPOSED OR COMPLETED OPERATIONS**

Summary of Corrective Action and Request for Spill Report Closure:

On May 26, 2012 approximately 87 bbls of water overflowed from temporary water tanks at Antero's Robinson A3 well in Garfield County. In the hours following the incident, Antero contained all spilled water on the site and dispatched a vacuum truck to remove the 87 bbls of water and the saturated soil. Antero added additional tanks to the site to prevent a similar occurrence in the future.

COGCC Form 19 Spill Report # 2224964 stated that Antero would apply microblaze to any excavated soil, to be followed by confirmation sampling prior to replacement of the soil.

Following initial fluid recovery, Antero dug potholes to collect additional fluid that had seeped into the soil. On June 19, 2012 Antero submitted a Waste Management Plan for the site at the request of the COGCC, explaining that the contaminated soils would be sent to South Canyon Landfill in Glenwood Springs. The disposal of the contaminated soils occurred in July, 2012.

Confirmation sampling results analyzed by ALS Group USA, Corp. demonstrated that the soil from the site was in compliance with COGCC Table 910-1 standards for organic compounds.

Because Antero has remediated the site and demonstrated site compliance with COGCC standards, Antero respectfully requests final COGCC closure of Spill Report # 2224964 in accordance with COGCC Rule 909(e).

See Attached conditions of approval.

This Spill has not been closed.

DOE 12/18/12

CONDITIONS OF APPROVAL

Antero Resources Piceance Corporation

Facility ID 336015; Spill Tracking No. 2224964

Robinson A Pad; API 05-045-13935

SWSW SEC 8 6, TS, R92W

Garfield County, Colorado pmr 12/18/12

Provide the number and locations of pot holes, depth of potholes, depth(s) and quantity of confirmation samples.

Provide information on how the 4000 +/- square foot aerial extent and vertical extent of impacted area was characterized and delineated.

Provide location of background samples that were collected.

Provide volume of impacted material and haul tickets for the material being disposed of at the South Canyon Landfill.

THIS SPILL HAS NOT BEEN CLOSED

WEBER
LAW FIRM, LLC

1580 Lincoln Street, Suite 1280
Denver, CO 80203
Phone: (303) 893-2005 Fax: (720) 484-3730

Monday, December 03, 2012
File no. Antero Resources

Alex Fischer
Environmental Supervisor- Western Colorado
Colorado Oil & Gas Conservation Commission
1120 Lincoln Street
Suite 801
Denver, CO, 80203

Re: Antero Resources Piceance Corporation

Dear Alex,

Please find the enclosed six Form 4s and related documentation for your review and consideration. We trust you will find everything in order, but if we can be of any further assistance as you review the submittals, please feel free to contact me at your convenience.

Thank you for all of your assistance as we work to close-out these outstanding matters.

Yours very truly,

Diane O'Neil

ALS Environmental

22-Jun-2012

Mark Mumby
HRL Compliance Solutions
744 Horizon Ct. Suite 140
Grand Junction, CO 81506

Re: **Antero Robinson A Produced Water Spill 6/7/12** Work Order: **1206468**

Dear Mark,

ALS Environmental received 4 samples on 14-Jun-2012 02:30 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

QC sample results for this data met laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 30.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Ann Preston

Electronically approved by: Ann Preston

Ann Preston
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac
Certificate No: MN331938

ALS Group USA, Corp

Date: 22-Jun-12

Client: *HRL Compliance Solutions*
Project: Antero Robinson A Produced Water Spill 6/7/12
Work Order: **1206468**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1206468-01	Robinson A	Soil		6/7/2012 11:20	6/14/2012 14:30	☐
1206468-02	Robinson A BKGD 1	Soil		6/7/2012 11:30	6/14/2012 14:30	☐
1206468-03	Robinson A BKGD 2	Soil		6/7/2012 11:35	6/14/2012 14:30	☐
1206468-04	Robinson A BKGD 3	Soil		6/7/2012 11:40	6/14/2012 14:30	☐

Client: HRL Compliance Solutions
Project: Antero Robinson A Produced Water Spill 6/7/12
Work Order: 1206468

Case Narrative

Batch 41725 MS/MSD data for Metals is not related to this project's samples.

Batch 41768 sample Robinson A MSD recovery for Hexavalent Chromium was below control limits. Both the MS recovery and RPD met quality control criteria. No data requires qualification.

Batch R106010 samples 1206468-01 and 1206468-04 were received after the hold time for pH had expired. Results should be considered estimated.

Batch R106099 sample Robinson A BKGD 3 % Moisture Duplicate holding time had expired before the samples was received. All samples for this work order were received after the hold time for % Moisture had expired.

Batch R106114 MS/MSD data for GRO is not related to this project's samples.

ALS Group USA, Corp

Date: 22-Jun-12

Client: HRL Compliance Solutions
Project: Antero Robinson A Produced Water Spill 6/7/12
WorkOrder: 1206468

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
SD	Serial Dilution
TDL	Target Detection Limit

Units Reported	Description
% of sample	Percent of Sample
µg/Kg-dry	Micrograms per Kilogram Dry Weight
as noted	
mg/Kg-dry	Milligrams per Kilogram Dry Weight
s.u.	Standard Units

ALS Group USA, Corp

Date: *22-Jun-12*

Client: HRL Compliance Solutions
Project: Antero Robinson A Produced Water Spill 6/7/12 **Work Order:** 1206468
Sample ID: Robinson A **Lab ID:** 1206468-01
Collection Date: 6/7/2012 11:20 AM **Matrix:** SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID			**SW8015M**		Prep Date: **6/19/2012**	Analyst: **CW**
DRO (C10-C28)	**27**		**4.5**	**mg/Kg-dry**	1	6/21/2012 10:34 AM
Surr: 4-Terphenyl-d14	*57.2*		*39-115*	*%REC*	1	6/21/2012 10:34 AM
GASOLINE RANGE ORGANICS BY GC-FID			**SW8015**			Analyst: **JD**
GRO (C6-C10)	ND		2.8	mg/Kg-dry	50	6/18/2012 06:14 PM
Surr: Toluene-d8	*98.6*		*50-150*	*%REC*	50	6/18/2012 06:14 PM
MERCURY BY CVAA			**SW7471**		Prep Date: **6/18/2012**	Analyst: **LR**
Mercury	ND		0.020	mg/Kg-dry	1	6/20/2012 11:01 AM
METALS BY ICP-MS			**SW6020A**		Prep Date: **6/19/2012**	Analyst: **ML**
Arsenic	**2.5**		**0.73**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
Barium	**150**		**0.73**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
Cadmium	ND		0.29	mg/Kg-dry	2	6/20/2012 08:18 PM
Chromium	**10**		**0.73**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
Copper	**10**		**0.73**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
Lead	**10**		**0.73**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
Nickel	**11**		**0.73**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
Selenium	**1.1**		**0.73**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
Silver	ND		0.73	mg/Kg-dry	2	6/20/2012 08:18 PM
Zinc	**51**		**1.5**	**mg/Kg-dry**	2	6/20/2012 08:18 PM
SUBCONTRACTED ANALYSES			**SUBCONTRACT**			Analyst: **A&LGL**
Subcontracted Analyses	**Rcvd 6/20/12**			**as noted**	1	6/20/2012
SEMI-VOLATILE ORGANIC COMPOUNDS			**SW8270**		Prep Date: **6/19/2012**	Analyst: **RM**
Acenaphthene	ND		16	µg/Kg-dry	1	6/20/2012 04:43 PM
Anthracene	ND		16	µg/Kg-dry	1	6/20/2012 04:43 PM
Benzo(a)anthracene	ND		22	µg/Kg-dry	1	6/20/2012 04:43 PM
Benzo(a)pyrene	ND		22	µg/Kg-dry	1	6/20/2012 04:43 PM
Benzo(b)fluoranthene	ND		22	µg/Kg-dry	1	6/20/2012 04:43 PM
Benzo(g,h,i)perylene	ND		33	µg/Kg-dry	1	6/20/2012 04:43 PM
Benzo(k)fluoranthene	ND		33	µg/Kg-dry	1	6/20/2012 04:43 PM
Chrysene	ND		16	µg/Kg-dry	1	6/20/2012 04:43 PM
Dibenzo(a,h)anthracene	ND		20	µg/Kg-dry	1	6/20/2012 04:43 PM
Fluoranthene	ND		16	µg/Kg-dry	1	6/20/2012 04:43 PM
Fluorene	ND		16	µg/Kg-dry	1	6/20/2012 04:43 PM
Indeno(1,2,3-cd)pyrene	ND		22	µg/Kg-dry	1	6/20/2012 04:43 PM
Naphthalene	**19**		**16**	**µg/Kg-dry**	1	6/20/2012 04:43 PM
Pyrene	ND		16	µg/Kg-dry	1	6/20/2012 04:43 PM
Surr: 2-Fluorobiphenyl	*63.8*		*12-100*	*%REC*	1	6/20/2012 04:43 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: HRL Compliance Solutions
Project: Antero Robinson A Produced Water Spill 6/7/12 **Work Order:** 1206468
Sample ID: Robinson A **Lab ID:** 1206468-01
Collection Date: 6/7/2012 11:20 AM **Matrix:** SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: 4-Terphenyl-d14	*90.5*		*25-137*	*%REC*	1	6/20/2012 04:43 PM
Surr: Nitrobenzene-d5	*61.7*		*37-107*	*%REC*	1	6/20/2012 04:43 PM
VOLATILE ORGANIC COMPOUNDS			**SW8260**		Prep Date: **6/15/2012**	Analyst: **AK**
Benzene	ND		34	µg/Kg-dry	1	6/16/2012 06:32 AM
Ethylbenzene	ND		34	µg/Kg-dry	1	6/16/2012 06:32 AM
m,p-Xylene	ND		67	µg/Kg-dry	1	6/16/2012 06:32 AM
o-Xylene	ND		34	µg/Kg-dry	1	6/16/2012 06:32 AM
Toluene	ND		34	µg/Kg-dry	1	6/16/2012 06:32 AM
Xylenes, Total	ND		100	µg/Kg-dry	1	6/16/2012 06:32 AM
Surr: 1,2-Dichloroethane-d4	*96.6*		*70-130*	*%REC*	1	6/16/2012 06:32 AM
Surr: 4-Bromofluorobenzene	*101*		*70-130*	*%REC*	1	6/16/2012 06:32 AM
Surr: Dibromofluoromethane	*96.6*		*70-130*	*%REC*	1	6/16/2012 06:32 AM
Surr: Toluene-d8	*102*		*70-130*	*%REC*	1	6/16/2012 06:32 AM
CHROMIUM, TRIVALENT			**CALCULATION**			Analyst: **JJG**
Chromium, Trivalent	**10**		**0.56**	**mg/Kg-dry**	1	6/21/2012 08:13 AM
CHROMIUM, HEXAVALENT			**SW7196A**		Prep Date: **6/18/2012**	Analyst: **MB**
Chromium, Hexavalent	ND		0.55	mg/Kg-dry	1	6/19/2012 02:30 PM
MOISTURE			**A2540 G**			Analyst: **CG**
Moisture	**11**	H	**0.050**	**% of sample**	1	6/15/2012 02:43 PM
PH			**SW9045D**			Analyst: **KV**
pH	**8.42**	H		**s.u.**	1	6/14/2012 11:20 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *22-Jun-12*

Client: HRL Compliance Solutions
Project: Antero Robinson A Produced Water Spill 6/7/12 **Work Order:** 1206468
Sample ID: Robinson A BKGD 1 **Lab ID:** 1206468-02
Collection Date: 6/7/2012 11:30 AM **Matrix:** SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			**SW6020A**		Prep Date: **6/19/2012**	Analyst: **ML**
Arsenic	**1.3**		**0.70**	**mg/Kg-dry**	2	6/20/2012 08:25 PM
MOISTURE			**A2540 G**			Analyst: **CG**
Moisture	**3.9**	H	**0.050**	**% of sample**	1	6/15/2012 02:43 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *22-Jun-12*

Client: HRL Compliance Solutions
Project: Antero Robinson A Produced Water Spill 6/7/12 **Work Order:** 1206468
Sample ID: Robinson A BKGD 2 **Lab ID:** 1206468-03
Collection Date: 6/7/2012 11:35 AM **Matrix:** SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			**SW6020A**		Prep Date: **6/19/2012**	Analyst: **ML**
Arsenic	**1.9**		**0.75**	**mg/Kg-dry**	2	6/20/2012 08:31 PM
MOISTURE			**A2540 G**			Analyst: **CG**
Moisture	**1.4**	H	**0.050**	**% of sample**	1	6/15/2012 02:43 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group USA, Corp

Date: *22-Jun-12*

Client: HRL Compliance Solutions
Project: Antero Robinson A Produced Water Spill 6/7/12 **Work Order:** 1206468
Sample ID: Robinson A BKGD 3 **Lab ID:** 1206468-04
Collection Date: 6/7/2012 11:40 AM **Matrix:** SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
METALS BY ICP-MS			**SW6020A**		Prep Date: **6/19/2012**	Analyst: **ML**
Arsenic	**2.1**		**0.83**	**mg/Kg-dry**	2	6/20/2012 08:37 PM
SUBCONTRACTED ANALYSES			**SUBCONTRACT**			Analyst: **A&LGL**
Subcontracted Analyses	**Rcvd 6/20/12**			**as noted**	1	6/20/2012
MOISTURE			**A2540 G**			Analyst: **CG**
Moisture	**19**	H	**0.050**	**% of sample**	1	6/15/2012 02:43 PM
PH			**SW9045D**			Analyst: **KV**
pH	**8.26**	H		**s.u.**	1	6/14/2012 11:20 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Report Number: F12170-0222
Acount Number: 91000

A & L GREAT LAKES LABORATORIES, INC.

3505 Conestoga Drive • Fort Wayne, Indiana 46808-4413 • Phone 260-483-4759 • Fax 260-483-5274
www.algreatlakes.com • lab@algreatlakes.com

QUALITY ANALYSES FOR INFORMED DECISIONS

TO: ALS LABORATORY GROUP
3352 128TH AVE
HOLLAND, MI 49424-9263

RE: 1206468

DATE RECEIVED: 06/18/2012
DATE REPORTED: 06/20/2012
PAGE: 1
P.O. NUMBER: 20-1206468

ATTN: ANN PRESTON

REPORT OF ANALYSIS

LAB NO.	SAMPLE ID	ANALYSIS	RESULT	UNIT	METHOD
37104	ROBINSON A	Sat'd Paste Extraction with DIW			USDA Handbook 60
		Conductivity (ECe)	2.84	mmho/cm	USDA Handbook 60
		Calcium (Sat'd Paste)	118	ppm	USDA Handbook 60
		Magnesium (Sat'd Paste)	105	ppm	USDA Handbook 60
		Sodium (Sat'd Paste)	1718	ppm	USDA Handbook 60
		Sodium Adsorption Ratio (SAR)	27.6	-	USDA Handbook 60
37105	ROBINSON A BKGD 3	Sat'd Paste Extraction with DIW			USDA Handbook 60
		Conductivity (ECe)	1.04	mmho/cm	USDA Handbook 60
		Calcium (Sat'd Paste)	69	ppm	USDA Handbook 60
		Magnesium (Sat'd Paste)	21	ppm	USDA Handbook 60
		Sodium (Sat'd Paste)	494	ppm	USDA Handbook 60
		Sodium Adsorption Ratio (SAR)	13.3	-	USDA Handbook 60

ALS Group USA, Corp

Date: 22-Jun-12

Client: HRL Compliance Solutions

QC BATCH REPORT

Work Order: 1206468

Project: Antero Robinson A Produced Water Spill 6/7/12

Batch ID: **41749** Instrument ID **GC8** Method: **SW8015M**

MBLK Sample ID: **DBLKS1-41749-41749** Units: **mg/Kg** Analysis Date: **6/19/2012 03:32 PM**

Client ID: Run ID: **GC8_120619A** SeqNo: **2004634** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	ND	4.2								
Surr: 4-Terphenyl-d14	*1.295*	0	*1.667*	0	*77.7*	*39-115*	0			

LCS Sample ID: **DLCSS1-41749-41749** Units: **mg/Kg** Analysis Date: **6/19/2012 03:57 PM**

Client ID: Run ID: **GC8_120619A** SeqNo: **2004635** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	142.4	4.2	166.7	0	85.4	60-130	0			
Surr: 4-Terphenyl-d14	*1.302*	0	*1.667*	0	*78.1*	*39-115*	0			

MS Sample ID: **1206417-13A MS** Units: **mg/Kg** Analysis Date: **6/19/2012 04:21 PM**

Client ID: Run ID: **GC8_120619A** SeqNo: **2004636** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	435.8	12	491.5	0	88.7	60-130	0			
Surr: 4-Terphenyl-d14	*3.918*	0	*4.915*	0	*79.7*	*39-115*	0			

MSD Sample ID: **1206417-13A MSD** Units: **mg/Kg** Analysis Date: **6/19/2012 04:46 PM**

Client ID: Run ID: **GC8_120619A** SeqNo: **2004637** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	438.8	12	479.6	0	91.5	60-130	435.8	0.677	30	
Surr: 4-Terphenyl-d14	*3.811*	0	*4.796*	0	*79.5*	*39-115*	3.918	*2.76*	*30*	

The following samples were analyzed in this batch: 1206468-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **R106114** Instrument ID **GC10** Method: **SW8015**

MBLK Sample ID: **MBLK-R106114-R106114** Units: **µg/L** Analysis Date: **6/18/2012 12:20 PM**
Client ID: Run ID: **GC10_120618A** SeqNo: **2002262** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	ND	200								
Surr: Toluene-d8	*104.4*	0	*100*	0	*104*	*70-130*	0			

LCS Sample ID: **LCS-R106114-R106114** Units: **µg/L** Analysis Date: **6/18/2012 11:31 AM**
Client ID: Run ID: **GC10_120618A** SeqNo: **2002261** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	27890	200	25000	0	112	70-130	0			
Surr: Toluene-d8	*103*	0	*100*	0	*103*	*70-130*	0			

MS Sample ID: **1206484-03A MS** Units: **µg/L** Analysis Date: **6/18/2012 09:12 PM**
Client ID: Run ID: **GC10_120618A** SeqNo: **2003850** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	22240	200	25000	0	89	70-130	0			
Surr: Toluene-d8	*56.22*	0	*100*	0	*56.2*	*70-130*	0			*S*

MSD Sample ID: **1206484-03A MSD** Units: **µg/L** Analysis Date: **6/18/2012 09:37 PM**
Client ID: Run ID: **GC10_120618A** SeqNo: **2003851** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
GRO (C6-C10)	23710	200	25000	0	94.9	70-130	22240	6.41	30	
Surr: Toluene-d8	*93.88*	0	*100*	0	*93.9*	*70-130*	56.22	*50.2*	*30*	*R*

The following samples were analyzed in this batch: 1206468-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41727** Instrument ID **HG1** Method: **SW7471**

MBLK Sample ID: **MBLK-41727-41727** Units: **mg/Kg** Analysis Date: **6/19/2012 03:51 PM**
Client ID: Run ID: **HG1_120619B** SeqNo: **2004237** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.020								

LCS Sample ID: **LCS-41727-41727** Units: **mg/Kg** Analysis Date: **6/19/2012 03:59 PM**
Client ID: Run ID: **HG1_120619B** SeqNo: **2004239** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.163	0.020	0.1665	0	97.9	80-120	0			

MS Sample ID: **1206565-10AMS** Units: **mg/Kg** Analysis Date: **6/19/2012 04:10 PM**
Client ID: Run ID: **HG1_120619B** SeqNo: **2004243** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.1453	0.017	0.1386	0.01881	91.3	75-125	0			

MSD Sample ID: **1206565-10AMSD** Units: **mg/Kg** Analysis Date: **6/19/2012 04:17 PM**
Client ID: Run ID: **HG1_120619B** SeqNo: **2004244** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.1445	0.016	0.1368	0.01881	91.8	75-125	0.1453	0.575	35	

The following samples were analyzed in this batch: 1206468-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41725** Instrument ID **ICPMS1** Method: **SW6020A**

MBLK Sample ID: **MBLK-41725-41725** Units: **mg/Kg** Analysis Date: **6/20/2012 11:18 AM**
Client ID: Run ID: **ICPMS1_120620A** SeqNo: **2005495** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.25								
Barium	ND	0.25								
Cadmium	ND	0.10								
Chromium	0.0136	0.25								J
Lead	ND	0.25								
Nickel	ND	0.25								
Selenium	ND	0.25								
Silver	ND	0.25								
Zinc	0.06005	0.50								J

MBLK Sample ID: **MBLK-41725-41725** Units: **mg/Kg** Analysis Date: **6/20/2012 04:05 PM**
Client ID: Run ID: **ICPMS1_120620A** SeqNo: **2006633** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	ND	0.25								
Barium	ND	0.25								
Cadmium	0.002316	0.10								J
Chromium	0.0208	0.25								J
Lead	0.01182	0.25								J
Nickel	0.006565	0.25								J
Selenium	ND	0.25								
Silver	0.001724	0.25								J
Zinc	0.1167	0.50								J

MBLK Sample ID: **MBLK-41725-41725** Units: **mg/Kg** Analysis Date: **6/21/2012 12:32 PM**
Client ID: Run ID: **ICPMS1_120621A** SeqNo: **2007466** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Copper	ND	0.25								

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41725** Instrument ID **ICPMS1** Method: **SW6020A**

LCS Sample ID: **LCS-41725-41725** Units: **mg/Kg** Analysis Date: **6/20/2012 11:24 AM**
Client ID: Run ID: **ICPMS1_120620A** SeqNo: **2005497** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	4.251	0.25	5	0	85	80-120	0			
Barium	4.432	0.25	5	0	88.6	80-120	0			
Cadmium	4.654	0.10	5	0	93.1	80-120	0			
Chromium	4.778	0.25	5	0	95.6	80-120	0			
Lead	4.562	0.25	5	0	91.2	80-120	0			
Nickel	4.769	0.25	5	0	95.4	80-120	0			
Selenium	4.216	0.25	5	0	84.3	80-120	0			
Silver	4.528	0.25	5	0	90.6	80-120	0			
Zinc	4.419	0.50	5	0	88.4	80-120	0			

LCS Sample ID: **LCS-41725-41725** Units: **mg/Kg** Analysis Date: **6/20/2012 04:12 PM**
Client ID: Run ID: **ICPMS1_120620A** SeqNo: **2006634** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	4.41	0.25	5	0	88.2	80-120	0			
Barium	4.552	0.25	5	0	91	80-120	0			
Cadmium	4.776	0.10	5	0	95.5	80-120	0			
Chromium	4.845	0.25	5	0	96.9	80-120	0			
Lead	4.661	0.25	5	0	93.2	80-120	0			
Nickel	4.73	0.25	5	0	94.6	80-120	0			
Selenium	4.338	0.25	5	0	86.8	80-120	0			
Silver	4.638	0.25	5	0	92.8	80-120	0			
Zinc	4.404	0.50	5	0	88.1	80-120	0			

LCS Sample ID: **LCS-41725-41725** Units: **mg/Kg** Analysis Date: **6/21/2012 12:38 PM**
Client ID: Run ID: **ICPMS1_120621A** SeqNo: **2007467** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Copper	4.406	0.25	5	0	88.1	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41725** Instrument ID **ICPMS1** Method: **SW6020A**

MS Sample ID: **1206523-01BMS** Units: **mg/Kg** Analysis Date: **6/20/2012 11:43 AM**
Client ID: Run ID: **ICPMS1_120620A** SeqNo: **2005527** Prep Date: **6/19/2012** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	11.3	0.71	7.133	7.627	51.5	80-120	0			S
Barium	172.2	0.71	7.133	182.3	-141	80-120	0			SO
Cadmium	6.381	0.29	7.133	0.1113	87.9	80-120	0			
Chromium	71.93	0.71	7.133	68.62	46.3	80-120	0			SO
Lead	16.63	0.71	7.133	10.92	80.2	80-120	0			
Nickel	30.2	0.71	7.133	25.11	71.4	80-120	0			S
Selenium	6.231	0.71	7.133	0.7854	76.3	80-120	0			S
Silver	5.563	0.71	7.133	0.03328	77.5	80-120	0			S
Zinc	40.24	1.4	7.133	35.52	66.2	80-120	0			SO

MS Sample ID: **1206523-01BMS** Units: **mg/Kg** Analysis Date: **6/21/2012 12:56 PM**
Client ID: Run ID: **ICPMS1_120621A** SeqNo: **2007470** Prep Date: **6/19/2012** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Copper	11.53	3.6	7.133	5.877	79.3	80-120	0			S

MSD Sample ID: **1206523-01BMSD** Units: **mg/Kg** Analysis Date: **6/20/2012 11:49 AM**
Client ID: Run ID: **ICPMS1_120620A** SeqNo: **2005529** Prep Date: **6/19/2012** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	13.67	0.78	7.8	7.627	77.4	80-120	11.3	19	25	S
Barium	180.7	0.78	7.8	182.3	-20.7	80-120	172.2	4.8	25	SO
Cadmium	7.037	0.31	7.8	0.1113	88.8	80-120	6.381	9.79	25	
Chromium	76.57	0.78	7.8	68.62	102	80-120	71.93	6.25	25	O
Lead	17.94	0.78	7.8	10.92	90.1	80-120	16.63	7.56	25	
Nickel	31.4	0.78	7.8	25.11	80.7	80-120	30.2	3.91	25	
Selenium	6.749	0.78	7.8	0.7854	76.5	80-120	6.231	7.98	25	S
Silver	6.025	0.78	7.8	0.03328	76.8	80-120	5.563	7.96	25	S
Zinc	41.58	1.6	7.8	35.52	77.7	80-120	40.24	3.26	25	SO

MSD Sample ID: **1206523-01BMSD** Units: **mg/Kg** Analysis Date: **6/21/2012 01:02 PM**
Client ID: Run ID: **ICPMS1_120621A** SeqNo: **2007471** Prep Date: **6/19/2012** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Copper	11.79	3.9	7.8	5.877	75.8	80-120	11.53	2.17	25	S

The following samples were analyzed in this batch: 1206468-01B 1206468-02A 1206468-03A 1206468-04A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41748** Instrument ID **SVMS6** Method: **SW8270**

MBLK Sample ID: **SBLKS1-41748-41748** Units: **µg/Kg** Analysis Date: **6/20/2012 04:57 PM**
Client ID: Run ID: **SVMS6_120620A** SeqNo: **2007465** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	ND	30								
Anthracene	ND	30								
Benzo(a)anthracene	ND	30								
Benzo(a)pyrene	ND	30								
Benzo(b)fluoranthene	ND	30								
Benzo(g,h,i)perylene	ND	30								
Benzo(k)fluoranthene	ND	30								
Chrysene	ND	30								
Dibenzo(a,h)anthracene	ND	30								
Fluoranthene	ND	30								
Fluorene	ND	30								
Indeno(1,2,3-cd)pyrene	ND	30								
Naphthalene	ND	30								
Pyrene	ND	30								
Surr: 2-Fluorobiphenyl	*1237*	0	*1667*	0	*74.2*	*12-100*	0			
Surr: 4-Terphenyl-d14	*1863*	0	*1667*	0	*112*	*25-137*	0			
Surr: Nitrobenzene-d5	*1253*	0	*1667*	0	*75.2*	*37-107*	0			

MBLK Sample ID: **SBLKS1-41748-41748** Units: **µg/Kg** Analysis Date: **6/20/2012 04:57 PM**
Client ID: Run ID: **SVMS4_120620A** SeqNo: **2007484** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	ND	30								
Anthracene	ND	30								
Benzo(a)anthracene	ND	30								
Benzo(a)pyrene	ND	30								
Benzo(b)fluoranthene	ND	30								
Benzo(g,h,i)perylene	ND	30								
Benzo(k)fluoranthene	ND	30								
Chrysene	ND	30								
Dibenzo(a,h)anthracene	ND	30								
Fluoranthene	ND	30								
Fluorene	ND	30								
Indeno(1,2,3-cd)pyrene	ND	30								
Naphthalene	ND	30								
Pyrene	ND	30								
Surr: 2-Fluorobiphenyl	*1237*	0	*1667*	0	*74.2*	*12-100*	0			
Surr: 4-Terphenyl-d14	*1863*	0	*1667*	0	*112*	*25-137*	0			
Surr: Nitrobenzene-d5	*1253*	0	*1667*	0	*75.2*	*37-107*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41748** Instrument ID **SVMS6** Method: **SW8270**

LCS Sample ID: **SLCSS1-41748-41748** Units: **µg/Kg** Analysis Date: **6/20/2012 02:41 PM**
Client ID: Run ID: **SVMS6_120620A** SeqNo: **2007458** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	595	30	666.7	0	89.2	45-110	0			
Anthracene	636.7	30	666.7	0	95.5	55-105	0			
Benzo(a)anthracene	624.3	30	666.7	0	93.6	50-110	0			
Benzo(a)pyrene	656.7	30	666.7	0	98.5	50-110	0			
Benzo(b)fluoranthene	640.3	30	666.7	0	96	45-115	0			
Benzo(g,h,i)perylene	743.7	30	666.7	0	112	40-125	0			
Benzo(k)fluoranthene	648	30	666.7	0	97.2	45-115	0			
Chrysene	685.3	30	666.7	0	103	55-110	0			
Dibenzo(a,h)anthracene	704.7	30	666.7	0	106	40-125	0			
Fluoranthene	669	30	666.7	0	100	55-115	0			
Fluorene	607	30	666.7	0	91	50-110	0			
Indeno(1,2,3-cd)pyrene	717.7	30	666.7	0	108	40-120	0			
Naphthalene	578.7	30	666.7	0	86.8	40-105	0			
Pyrene	686.7	30	666.7	0	103	45-125	0			
Surr: 2-Fluorobiphenyl	*1280*	0	*1667*	0	*76.8*	*12-100*	0			
Surr: 4-Terphenyl-d14	*1835*	0	*1667*	0	*110*	*25-137*	0			
Surr: Nitrobenzene-d5	*1294*	0	*1667*	0	*77.6*	*37-107*	0			

LCS Sample ID: **SLCSS1-41748-41748** Units: **µg/Kg** Analysis Date: **6/20/2012 02:41 PM**
Client ID: Run ID: **SVMS4_120620A** SeqNo: **2007480** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	595	30	666.7	0	89.2	45-110	0			
Anthracene	636.7	30	666.7	0	95.5	55-105	0			
Benzo(a)anthracene	624.3	30	666.7	0	93.6	50-110	0			
Benzo(a)pyrene	656.7	30	666.7	0	98.5	50-110	0			
Benzo(b)fluoranthene	640.3	30	666.7	0	96	45-115	0			
Benzo(g,h,i)perylene	743.7	30	666.7	0	112	40-125	0			
Benzo(k)fluoranthene	648	30	666.7	0	97.2	45-115	0			
Chrysene	685.3	30	666.7	0	103	55-110	0			
Dibenzo(a,h)anthracene	704.7	30	666.7	0	106	40-125	0			
Fluoranthene	669	30	666.7	0	100	55-115	0			
Fluorene	607	30	666.7	0	91	50-110	0			
Indeno(1,2,3-cd)pyrene	717.7	30	666.7	0	108	40-120	0			
Naphthalene	578.7	30	666.7	0	86.8	40-105	0			
Pyrene	686.7	30	666.7	0	103	45-125	0			
Surr: 2-Fluorobiphenyl	*1280*	0	*1667*	0	*76.8*	*12-100*	0			
Surr: 4-Terphenyl-d14	*1835*	0	*1667*	0	*110*	*25-137*	0			
Surr: Nitrobenzene-d5	*1294*	0	*1667*	0	*77.6*	*37-107*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Batch ID: **41748** Instrument ID **SVMS6** Method: **SW8270**

MS Sample ID: **1206417-13A MS** Units: **µg/Kg** Analysis Date: **6/20/2012 03:15 PM**
Client ID: Run ID: **SVMS6_120620A** SeqNo: **2007459** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1642	85	1888	0	86.9	45-110	0			
Anthracene	1801	85	1888	0	95.4	55-105	0			
Benzo(a)anthracene	1830	85	1888	79.3	92.7	50-110	0			
Benzo(a)pyrene	1921	85	1888	115.1	95.7	50-110	0			
Benzo(b)fluoranthene	1965	85	1888	151.8	96	45-115	0			
Benzo(g,h,i)perylene	1781	85	1888	87.03	89.7	40-125	0			
Benzo(k)fluoranthene	1824	85	1888	55.12	93.7	45-115	0			
Chrysene	1892	85	1888	115.1	94.1	55-110	0			
Dibenzo(a,h)anthracene	1695	85	1888	0	89.7	40-125	0			
Fluoranthene	1920	85	1888	105.4	96.1	55-115	0			
Fluorene	1737	85	1888	0	92	50-110	0			
Indeno(1,2,3-cd)pyrene	1797	85	1888	61.89	91.9	40-120	0			
Naphthalene	1414	85	1888	0	74.9	40-105	0			
Pyrene	1920	85	1888	126.7	95	45-125	0			
Surr: 2-Fluorobiphenyl	*3448*	0	*4720*	0	*73*	*12-100*	0			
Surr: 4-Terphenyl-d14	*4775*	0	*4720*	0	*101*	*25-137*	0			
Surr: Nitrobenzene-d5	*3086*	0	*4720*	0	*65.4*	*37-107*	0			

MS Sample ID: **1206417-13A MS** Units: **µg/Kg** Analysis Date: **6/20/2012 03:15 PM**
Client ID: Run ID: **SVMS4_120620A** SeqNo: **2007481** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1642	85	1888	0	86.9	45-110	0			
Anthracene	1801	85	1888	0	95.4	55-105	0			
Benzo(a)anthracene	1830	85	1888	79.3	92.7	50-110	0			
Benzo(a)pyrene	1921	85	1888	115.1	95.7	50-110	0			
Benzo(b)fluoranthene	1965	85	1888	151.8	96	45-115	0			
Benzo(g,h,i)perylene	1781	85	1888	87.03	89.7	40-125	0			
Benzo(k)fluoranthene	1824	85	1888	55.12	93.7	45-115	0			
Chrysene	1892	85	1888	115.1	94.1	55-110	0			
Dibenzo(a,h)anthracene	1695	85	1888	0	89.7	40-125	0			
Fluoranthene	1920	85	1888	105.4	96.1	55-115	0			
Fluorene	1737	85	1888	0	92	50-110	0			
Indeno(1,2,3-cd)pyrene	1797	85	1888	61.89	91.9	40-120	0			
Naphthalene	1414	85	1888	0	74.9	40-105	0			
Pyrene	1920	85	1888	126.7	95	45-125	0			
Surr: 2-Fluorobiphenyl	*3448*	0	*4720*	0	*73*	*12-100*	0			
Surr: 4-Terphenyl-d14	*4775*	0	*4720*	0	*101*	*25-137*	0			
Surr: Nitrobenzene-d5	*3086*	0	*4720*	0	*65.4*	*37-107*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41748** Instrument ID **SVMS6** Method: **SW8270**

MSD Sample ID: **1206417-13A MSD** Units: **µg/Kg** Analysis Date: **6/20/2012 03:49 PM**
Client ID: Run ID: **SVMS6_120620A** SeqNo: **2007461** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1741	88	1952	0	89.2	45-110	1642	5.89	30	
Anthracene	1908	88	1952	0	97.7	55-105	1801	5.77	30	
Benzo(a)anthracene	1899	88	1952	79.3	93.2	50-110	1830	3.75	30	
Benzo(a)pyrene	2035	88	1952	115.1	98.4	50-110	1921	5.77	30	
Benzo(b)fluoranthene	2250	88	1952	151.8	107	45-115	1965	13.5	30	
Benzo(g,h,i)perylene	1644	88	1952	87.03	79.7	40-125	1781	8.04	30	
Benzo(k)fluoranthene	2174	88	1952	55.12	109	45-115	1824	17.5	30	
Chrysene	2020	88	1952	115.1	97.6	55-110	1892	6.53	30	
Dibenzo(a,h)anthracene	1645	88	1952	0	84.2	40-125	1695	2.98	30	
Fluoranthene	2061	88	1952	105.4	100	55-115	1920	7.05	30	
Fluorene	1805	88	1952	0	92.4	50-110	1737	3.83	30	
Indeno(1,2,3-cd)pyrene	1706	88	1952	61.89	84.2	40-120	1797	5.21	30	
Naphthalene	1536	88	1952	0	78.7	40-105	1414	8.28	30	
Pyrene	2020	88	1952	126.7	97	45-125	1920	5.09	30	
Surr: 2-Fluorobiphenyl	*3667*	0	*4881*	0	*75.1*	*12-100*	3448	*6.17*	*40*	
Surr: 4-Terphenyl-d14	*5029*	0	*4881*	0	*103*	*25-137*	4775	*5.18*	*40*	
Surr: Nitrobenzene-d5	*3350*	0	*4881*	0	*68.6*	*37-107*	3086	*8.2*	*40*	

MSD Sample ID: **1206417-13A MSD** Units: **µg/Kg** Analysis Date: **6/20/2012 03:49 PM**
Client ID: Run ID: **SVMS4_120620A** SeqNo: **2007482** Prep Date: **6/19/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acenaphthene	1741	88	1952	0	89.2	45-110	1642	5.89	30	
Anthracene	1908	88	1952	0	97.7	55-105	1801	5.77	30	
Benzo(a)anthracene	1899	88	1952	79.3	93.2	50-110	1830	3.75	30	
Benzo(a)pyrene	2035	88	1952	115.1	98.4	50-110	1921	5.77	30	
Benzo(b)fluoranthene	2250	88	1952	151.8	107	45-115	1965	13.5	30	
Benzo(g,h,i)perylene	1644	88	1952	87.03	79.7	40-125	1781	8.04	30	
Benzo(k)fluoranthene	2174	88	1952	55.12	109	45-115	1824	17.5	30	
Chrysene	2020	88	1952	115.1	97.6	55-110	1892	6.53	30	
Dibenzo(a,h)anthracene	1645	88	1952	0	84.2	40-125	1695	2.98	30	
Fluoranthene	2061	88	1952	105.4	100	55-115	1920	7.05	30	
Fluorene	1805	88	1952	0	92.4	50-110	1737	3.83	30	
Indeno(1,2,3-cd)pyrene	1706	88	1952	61.89	84.2	40-120	1797	5.21	30	
Naphthalene	1536	88	1952	0	78.7	40-105	1414	8.28	30	
Pyrene	2020	88	1952	126.7	97	45-125	1920	5.09	30	
Surr: 2-Fluorobiphenyl	*3667*	0	*4881*	0	*75.1*	*12-100*	3448	*6.17*	*40*	
Surr: 4-Terphenyl-d14	*5029*	0	*4881*	0	*103*	*25-137*	4775	*5.18*	*40*	
Surr: Nitrobenzene-d5	*3350*	0	*4881*	0	*68.6*	*37-107*	3086	*8.2*	*40*	

The following samples were analyzed in this batch: 1206468-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41683** Instrument ID **VMS7** Method: **SW8260**

MBLK Sample ID: **MBLK-41683-41683** Units: **µg/Kg** Analysis Date: **6/15/2012 10:24 AM**
Client ID: Run ID: **VMS7_120615A** SeqNo: **2001538** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	ND	30								
Ethylbenzene	ND	30								
m,p-Xylene	ND	60								
o-Xylene	ND	30								
Toluene	ND	30								
Xylenes, Total	ND	90								
Surr: 1,2-Dichloroethane-d4	*998.5*	0	*1000*	0	*99.8*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1016*	0	*1000*	0	*102*	*70-130*	0			
Surr: Dibromofluoromethane	*990.5*	0	*1000*	0	*99*	*70-130*	0			
Surr: Toluene-d8	*1026*	0	*1000*	0	*103*	*70-130*	0			

MBLK Sample ID: **MBLK-41683-41683** Units: **µg/Kg** Analysis Date: **6/15/2012 06:39 PM**
Client ID: Run ID: **VMS8_120615A** SeqNo: **2001688** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	ND	30								
Ethylbenzene	ND	30								
m,p-Xylene	ND	60								
o-Xylene	ND	30								
Toluene	ND	30								
Xylenes, Total	ND	90								
Surr: 1,2-Dichloroethane-d4	*1136*	0	*1000*	0	*114*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*966.5*	0	*1000*	0	*96.6*	*70-130*	0			
Surr: Dibromofluoromethane	*1016*	0	*1000*	0	*102*	*70-130*	0			
Surr: Toluene-d8	*988*	0	*1000*	0	*98.8*	*70-130*	0			

MBLK Sample ID: **MBLK-41683-41683** Units: **µg/Kg** Analysis Date: **6/18/2012 02:38 PM**
Client ID: Run ID: **VMS9_120618A** SeqNo: **2003185** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	ND	30								
Ethylbenzene	ND	30								
m,p-Xylene	ND	60								
o-Xylene	ND	30								
Toluene	ND	30								
Xylenes, Total	ND	90								
Surr: 1,2-Dichloroethane-d4	*945.5*	0	*1000*	0	*94.6*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*908.5*	0	*1000*	0	*90.8*	*70-130*	0			
Surr: Dibromofluoromethane	*964.5*	0	*1000*	0	*96.4*	*70-130*	0			
Surr: Toluene-d8	*990.5*	0	*1000*	0	*99*	*70-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41683** Instrument ID **VMS7** Method: **SW8260**

LCS Sample ID: **LCS-41683-41683** Units: **µg/Kg** Analysis Date: **6/15/2012 09:09 AM**
Client ID: Run ID: **VMS7_120615A** SeqNo: **2001535** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	946	30	1000	0	94.6	75-125	0			
Ethylbenzene	959	30	1000	0	95.9	75-125	0			
m,p-Xylene	1892	60	2000	0	94.6	80-125	0			
o-Xylene	966.5	30	1000	0	96.6	75-125	0			
Toluene	974	30	1000	0	97.4	70-125	0			
Xylenes, Total	2858	90	3000	0	95.3	75-125	0			
Surr: 1,2-Dichloroethane-d4	*964*	0	*1000*	0	*96.4*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1020*	0	*1000*	0	*102*	*70-130*	0			
Surr: Dibromofluoromethane	*1038*	0	*1000*	0	*104*	*70-130*	0			
Surr: Toluene-d8	*1015*	0	*1000*	0	*102*	*70-130*	0			

LCS Sample ID: **LCS-41683-41683** Units: **µg/Kg** Analysis Date: **6/15/2012 05:11 PM**
Client ID: Run ID: **VMS8_120615A** SeqNo: **2001687** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	894	30	1000	0	89.4	75-125	0			
Ethylbenzene	1001	30	1000	0	100	75-125	0			
m,p-Xylene	1984	60	2000	0	99.2	80-125	0			
o-Xylene	983	30	1000	0	98.3	75-125	0			
Toluene	943.5	30	1000	0	94.4	70-125	0			
Xylenes, Total	2968	90	3000	0	98.9	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1146*	0	*1000*	0	*115*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*994.5*	0	*1000*	0	*99.4*	*70-130*	0			
Surr: Dibromofluoromethane	*1036*	0	*1000*	0	*104*	*70-130*	0			
Surr: Toluene-d8	*1007*	0	*1000*	0	*101*	*70-130*	0			

LCS Sample ID: **LCS-41683-41683** Units: **µg/Kg** Analysis Date: **6/18/2012 01:08 PM**
Client ID: Run ID: **VMS9_120618A** SeqNo: **2003182** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	960.5	30	1000	0	96	75-125	0			
Ethylbenzene	1035	30	1000	0	104	75-125	0			
m,p-Xylene	1868	60	2000	0	93.4	80-125	0			
o-Xylene	903.5	30	1000	0	90.4	75-125	0			
Toluene	985.5	30	1000	0	98.6	70-125	0			
Xylenes, Total	2772	90	3000	0	92.4	75-125	0			
Surr: 1,2-Dichloroethane-d4	*926*	0	*1000*	0	*92.6*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*975*	0	*1000*	0	*97.5*	*70-130*	0			
Surr: Dibromofluoromethane	*968.5*	0	*1000*	0	*96.8*	*70-130*	0			
Surr: Toluene-d8	*969*	0	*1000*	0	*96.9*	*70-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41683** Instrument ID **VMS7** Method: **SW8260**

MS Sample ID: **1206508-15B MS** Units: **µg/Kg** Analysis Date: **6/16/2012 03:26 AM**
Client ID: Run ID: **VMS8_120615A** SeqNo: **2001697** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1111	6.3	1266	0	87.8	75-125	0			
Ethylbenzene	1204	6.3	1266	0	95.1	75-125	0			
m,p-Xylene	2409	3.2	2532	0	95.2	80-125	0			
o-Xylene	1173	3.2	1266	0	92.6	75-125	0			
Toluene	1141	6.3	1266	0	90.1	70-125	0			
Xylenes, Total	3582	6.3	3797	0	94.3	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1473*	0	*1266*	0	*116*	*70-120*	0			
Surr: 4-Bromofluorobenzene	*1249*	0	*1266*	0	*98.6*	*75-120*	0			
Surr: Dibromofluoromethane	*1320*	0	*1266*	0	*104*	*85-115*	0			
Surr: Toluene-d8	*1282*	0	*1266*	0	*101*	*85-120*	0			

MSD Sample ID: **1206508-15B MSD** Units: **µg/Kg** Analysis Date: **6/16/2012 03:51 AM**
Client ID: Run ID: **VMS8_120615A** SeqNo: **2001698** Prep Date: **6/15/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1085	6.3	1266	0	85.8	75-125	1111	2.36	30	
Ethylbenzene	1176	6.3	1266	0	92.9	75-125	1204	2.34	30	
m,p-Xylene	2359	3.2	2532	0	93.2	80-125	2409	2.1	30	
o-Xylene	1175	3.2	1266	0	92.8	75-125	1173	0.216	30	
Toluene	1129	6.3	1266	0	89.2	70-125	1141	1	30	
Xylenes, Total	3535	6.3	3797	0	93.1	75-125	3582	1.33	30	
Surr: 1,2-Dichloroethane-d4	*1491*	0	*1266*	0	*118*	*70-120*	1473	*1.24*	*30*	
Surr: 4-Bromofluorobenzene	*1211*	0	*1266*	0	*95.7*	*75-120*	1249	*3.04*	*30*	
Surr: Dibromofluoromethane	*1323*	0	*1266*	0	*104*	*85-115*	1320	*0.192*	*30*	
Surr: Toluene-d8	*1259*	0	*1266*	0	*99.4*	*85-120*	1282	*1.79*	*30*	

The following samples were analyzed in this batch: 1206468-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **41768** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MBLK-41768-41768** Units: **mg/Kg** Analysis Date: **6/19/2012 02:30 PM**
Client ID: Run ID: **WETCHEM_120619C** SeqNo: **2004183** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.50								

LCS Sample ID: **LCS-41768-41768** Units: **mg/Kg** Analysis Date: **6/19/2012 02:30 PM**
Client ID: Run ID: **WETCHEM_120619C** SeqNo: **2004182** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	1.96	0.50	1.992	0	98.4	75-110	0			

MS Sample ID: **1206468-01B MS** Units: **mg/Kg** Analysis Date: **6/19/2012 02:30 PM**
Client ID: **Robinson A** Run ID: **WETCHEM_120619C** SeqNo: **2004177** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	1.184	0.49	1.961	0	60.4	60-130	0			

MSD Sample ID: **1206468-01B MSD** Units: **mg/Kg** Analysis Date: **6/19/2012 02:30 PM**
Client ID: **Robinson A** Run ID: **WETCHEM_120619C** SeqNo: **2004178** Prep Date: **6/18/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	1.147	0.50	1.984	0	57.8	60-130	1.184	3.22	30	S

The following samples were analyzed in this batch: 1206468-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions

Work Order: 1206468

Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **R106010** Instrument ID **WETCHEM** Method: **SW9045D**

LCS Sample ID: **LCS-R106010-R106010** Units: **s.u.** Analysis Date: **6/14/2012 11:20 AM**

Client ID: Run ID: **WETCHEM_120614N** SeqNo: **1999663** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	4.01	0	4.4	0	91.1	90-110	0			

DUP Sample ID: **1206468-01B DUP** Units: **s.u.** Analysis Date: **6/14/2012 11:20 AM**

Client ID: **Robinson A** Run ID: **WETCHEM_120614N** SeqNo: **1999665** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	8.42	0	0	0	0	0-0	8.42	0	20	H

The following samples were analyzed in this batch: 1206468-01B 1206468-04A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: HRL Compliance Solutions
Work Order: 1206468
Project: Antero Robinson A Produced Water Spill 6/7/12

QC BATCH REPORT

Batch ID: **R106099** Instrument ID **MOIST** Method: **A2540 G**

MBLK Sample ID: **WBLKS1-R106099** Units: **% of sample** Analysis Date: **6/15/2012 02:43 PM**
Client ID: Run ID: **MOIST_120615B** SeqNo: **2002010** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	ND	0.050								

LCS Sample ID: **LCS-R106099** Units: **% of sample** Analysis Date: **6/15/2012 02:43 PM**
Client ID: Run ID: **MOIST_120615B** SeqNo: **2002009** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **1206468-04ADUP** Units: **% of sample** Analysis Date: **6/15/2012 02:43 PM**
Client ID: **Robinson A BKGD 3** Run ID: **MOIST_120615B** SeqNo: **2001996** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	18.7	0.050	0	0	0	0-0	19.42	3.78	20	H

DUP Sample ID: **1206485-21ADUP** Units: **% of sample** Analysis Date: **6/15/2012 02:43 PM**
Client ID: Run ID: **MOIST_120615B** SeqNo: **2002059** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	28.72	0.050	0	0	0	0-0	28.2	1.83	20	

The following samples were analyzed in this batch:

1206468-01B	1206468-02A	1206468-03A
1206468-04A		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202r8

WORKORDER # 1206468

PAGE 1 of 1

DISPOSAL: By Lab or Return to Client

PROJECT NAME	Robinson A Produced Water Spill	SAMPLER	Reed Wold
PROJECT No.		SITE ID	Robinson A
		EDD FORMAT	
		PURCHASE ORDER	
COMPANY NAME	HCSI	BILL TO COMPANY	Antero Resources
SEND REPORT TO	Mark Mumby	INVOICE ATTN TO	Cole Kilstrom
ADDRESS	744 Horizon Ct Ste 140	ADDRESS	1625 17th St.
CITY / STATE / ZIP	Grand Junction CO 81506	CITY / STATE / ZIP	Denver CO 80202
PHONE	970-243-3271	PHONE	303-357-7341
FAX	970-243-3280	FAX	
E-MAIL	Mmumby@hricomp.com	E-MAIL	Ckilstrom@anteroresources.com

DATE: 6/13/2012

TURNAROUND: standard

Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres	QC	BTEX/ GRO	DRO/ PAH/ Metals (Table 910-1)	SAR/ Ec/ pH	Arsenic
1	Robinson A	SO	6/7/2012	11:20	3	8		X	X	X	
2	Robinson A BKGD 1	SO	6/7/2012	11:30	1	8					X
3	Robinson A BKGD 2	SO	6/7/2012	11:35	1	8					X
4	Robinson A BKGD 3	SO	6/7/2012	11:40	2	8				X	X

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:

5.2°C

QC PACKAGE (check below)	
X	LEVEL II (Standard QC)
	LEVEL III (Std QC + forms)
	LEVEL IV (Std QC + forms + raw data)

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	Reed Wold	Reed Wold	6/13/12	5:00
RECEIVED BY		Keith Wierenga	6/14/12	1430
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

CHAIN-OF-CUSTODY RECORD

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Date: 15-Jun-12
COC ID: 3707
Due D 20-Jun-12

ALS Environmental

Subcontractor:
A & L Great Lakes Agricultural La
3505 Conestoga Dr
Ft. Wayne, IN 46808
TEL: (260) 483-4759
FAX: (260) 483-5274
Acct#: 91000

Salesperson: Bruce Schlatter

Customer Information		Project Information		Parameter/Method Request for Analysis
Purchase Order		Project Name	1206468	A Subcontracted Analyses (SUBCONTRACT) SAR-EC
Work Order		Project Number		B
Company Name	ALS Group USA, Corp	Bill To Company	ALS Group USA, Corp	C
Send Report To	Ann Preston	Inv Attn	Accounts Payable	D
Address	3352 128th Avenue	Address	3352 128th Avenue	E
				F
City/State/Zip	Holland, Michigan 49424-9263	City/State/Zip	Holland, Michigan 49424-9263	G
Phone	(616) 399-6070	Phone	(616) 399-6070	H
Fax	(616) 399-6185	Fax	(616) 399-6185	I
eMail Address	ann.preston@alsglobal.com	eMail CC		J

ALS Sample ID	Client Sample ID	Matrix	Collection Date 24hr	Bottle	A	B	C	D	E	F	G	H	I	J
1206468-01C	Robinson A	Soil	7/Jun/2012 11:20	(1) MISC	X									
1206468-04B	Robinson A BKGD 3	Soil	7/Jun/2012 11:40	(1) MISC	X									

Comments:
Please analyze for SAR-EC. Email results to Ann Preston.

Relinquished by:	Date/Time	Received by:	Date/Time	Cooler IDs	Report/QC Level
	6/15/12				Std
Relinquished by:	Date/Time	Received by:	Date/Time		

ALS Group USA, Corp

Sample Receipt Checklist

Client Name: **HRL** Date/Time Received: **14-Jun-12 14:30**

Work Order: **1206468** Received by: **KRW**

Checklist completed by *Keith Wareng* eSignature 14-Jun-12 Date Reviewed by: *Ann Preston* eSignature 15-Jun-12 Date

Matrices: Soil
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	5.2 C		
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:			

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

FedEx Express **NEW Package US Airbill**

FedEx Tracking Number 8008 9259 9243

0200 Form ID No.

FedEx Retrieval Copy

1 From

Date 6/13/12 [redacted]

Sender's Name Reed Wild

Company HCSI

Phone 970 243 3271

Address 744 Horizon ct. ste 140

City Grand Junction State CO ZIP 81506

2 Your Internal Billing Reference

3 To

Recipient's Name Sample Receiving

Company DLS Group

Phone 411 391-4470

4 Express Package Service

NOTE: Service order has changed. Please select carefully.

Next Business Day

06 [ ] FedEx First Overnight

01 [ ] FedEx Priority Overnight

05 [ ] FedEx Standard Overnight

2 or 3 Business Days

[ ] NEW FedEx 2Day A.M.

03 [ ] FedEx 2Day

20 [ ] FedEx Express Saver

Packages up to 150 lbs.

5 Packaging

06 [ ] FedEx Envelope 02 [ ] FedEx Pak 03 FedEx Box 04 [ ] FedEx Tube 01 Other

6 Special Handling and Delivery Signature Options

03 [ ] SATURDAY DELIVERY

No Signature Required

10 Direct Signature

31 Indirect Signature

Cargo Aircraft Only

Quality Envirotmental Containers 800-255-3850 • 304-255-3500

8008 9259 9243

Total Packages 1 Total Weight 20

[redacted]

Obtain recip. Acct. No. [ ]

Cash/Check

612

fedex.com 1.800.GoFedEx 1.800.463.3339

Page 1

FORM 4
Rev 12/05

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)894-2100 Fax:(303)894-2109

SUNDRY NOTICE

Submit original plus one copy. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form.) Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b.)

RECEIVED
DEC 3 - 2012
COGCC

1. OGCC Operator Number: 10079
2. Name of Operator: Antero Resources Piceance Corporation
3. Address: 1625 17th Street
City: Denver State: CO Zip:80202
4. Contact Name: Gerard G. Alberts
Phone: 303-357-7341
Fax: 303-357-7315

Complete the Attachment Checklist — OP OGCC

5. API Number 05- 045-13935
6. Well/Facility Name: Robinson A Pad
7. Well/Facility Number: Robinson #A3
8. Location (QtrQtr, Sec, Twp, Rng, Meridian): SWSW 8 6S 92W 6th
9. County: Garfield
10. Field Name:
11. Federal, Indian or State Lease Number:
OGCC Facility ID Number: 336015

Survey Plat		
Directional Survey		
Surface Eqpmt Diagram		
Technical Info Page	X	
Other		

General Notice

☐ CHANGE OF LOCATION: Attach New Survey Plat (a change of surface qtrqtr is substantive and requires a new permit)

	FNL/FSL		FEL/FWL	
Change of Surface Footage from Exterior Section Lines:				
Change of Surface Footage to Exterior Section Lines:				
Change of Bottomhole Footage from Exterior Section Lines:				
Change of Bottomhole Footage to Exterior Section Lines:				attach directional survey

Bottomhole location Qtr/Qtr, Sec, Twp, Rng, Mer
Latitude — Distance to nearest property line — Distance to nearest bldg, public rd, utility or RR
Longitude — Distance to nearest lease line — Is location in a High Density Area (rule 603b)? Yes/No
Ground Elevation — Distance to nearest well same formation — Surface owner consultation date:

GPS DATA:
Date of Measurement — PDOP Reading — Instrument Operator's Name

☐ CHANGE SPACING UNIT
Formation | Formation Code | Spacing order number | Unit Acreage | Unit configuration

☐ Remove from surface bond
Signed surface use agreement attached

☐ CHANGE OF OPERATOR (prior to drilling):
Effective Date:
Plugging Bond: ☐ Blanket ☐ Individual

☐ CHANGE WELL NAME
From: NUMBER
To:
Effective Date:

☐ ABANDONED LOCATION:
Was location ever built? ☐ Yes ☐ No
Is site ready for inspection? ☐ Yes ☐ No
Date Ready for Inspection:

☐ NOTICE OF CONTINUED SHUT IN STATUS
Date well shut in or temporarily abandoned:
Has Production Equipment been removed from site? ☐ Yes ☐ No
MIT required if shut in longer than two years. Date of last MIT:

☐ SPUD DATE:

☐ REQUEST FOR CONFIDENTIAL STATUS (6 mos from date casing set)

☐ SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK *submit cbl and cement job summaries

Method used	Cementing tool setting/perf depth	Cement volume	Cement top	Cement bottom	Date

☐ RECLAMATION: Attach technical page describing final reclamation procedures per Rule 1004.
Final reclamation will commence on approximately
☐ Final reclamation is completed and site is ready for inspection.

Technical Engineering/Environmental Notice

☐ Notice of Intent
Approximate Start Date:

☐ Report of Work Done
Date Work Completed:

Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)

☐ Intent to Recomplete (submit form 2)	☐ Request to Vent or Flare	☐ E&P Waste Disposal
☐ Change Drilling Plans	☐ Repair Well	☐ Beneficial Reuse of E&P Waste
☐ Gross Interval Changed?	☐ Rule 502 variance requested	☒ Status Update/Change of Remediation Plans for Spills and Releases
☐ Casing/Cementing Program Change	☐ Other:	

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: — Date: 6-19-2012 — Email: jalberts@anteroresources.com
Print Name: Gerald G. Alberts — Title: Manager, Environmental and Regulatory

COGCC Approved: — Title: — Date:
CONDITIONS OF APPROVAL, IF ANY:

FORM 4 Rev 12/05

Page 2

TECHNICAL INFORMATION PAGE

FOR OGCC USE ONLY

RECEIVED
DEC 3 - 2012
COGCC

1. OGCC Operator Number: 10079 API Number: 05-045-13935
2. Name of Operator: Antero Resources Piceance Corpora OGCC Facility ID # 338015
3. Well/Facility Name: Robinson A Pad Well/Facility Number: #A3
4. Location (QtrQtr, Sec, Twp, Rng, Meridian): SWSW 8 6S 92W 6th

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. **DESCRIBE PROPOSED OR COMPLETED OPERATIONS**

Please see attached Waste Management Plan with regards to Spill # 2224964.

Antero Resources Piceance Corporation
Waste Management Plan
Robinson A Pad Spill # 2224964

As requested by Linda Spry O'Rourke with the Colorado Oil and Gas Conservation Commission (COGCC) on June 6, 2012, Antero Resources Piceance Corporation (Antero) is submitting the below waste management plan for the contaminated soils at the Robinson A Pad.

On May 26, 2012, approximately 87 barrels of produced and fresh water overflowed onto the pad. The water was approximately 80% freshwater and 20% produced water. All water was contained on site and immediately removed by vacuum truck. Approximately 40 cubic yards of saturated soil was removed and placed on lined containment with berms on site.

The disposal of contaminated soil will be conducted in accordance with Antero's field wide Waste Management Plan for Spills—Contaminated Soils & Media. See attached Waste Management Plan for further details. A waste profile will be completed on a composite sample of the impacted soils. The contaminated soils will be sent to South Canyon Landfill—Glenwood Springs. Antero will keep a record of the following information:

- Facility location/pad name;
- Type of waste (notes if combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- Obtain transporter signatures for records.

This information will be recorded on a Non-Hazardous Waste Manifest (See Attachment B of Waste Management Plan) and returned to Antero's EHS Department.

Antero Resources Piceance Corporation

Waste Management Plan
Colorado
Oil & Natural Gas Production Facilities

January 2011

ANTERO RESOURCES

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ATTACHMENTS

Attachment A – COGCC Table 910-1

Attachment B – Non-Hazardous Waste Manifest

Attachment C – List of Antero Approved Laboratories

Attachment D – List of Antero Approved Disposal Facilities

1.0 WASTE MANAGEMENT PLAN OVERVIEW

The information presented in Waste Management Plan is intended to provide procedures and information to facilitate Antero Resources Piceance Corporation's (Antero) ongoing management of Exploration and Production (E&P) and other solid wastes generated from its Colorado operations.

The information presented in this Plan will provide an overview of the wastes generated and managed at Antero facilities and will describe how each of the waste streams will be handled, transported, treated, recycled and/or disposed. The Waste Management Plan has been developed to provide Antero personnel with instructions on how specific waste streams should be managed from characterization through final treatment or disposal. The plan has been implemented to ensure that wastes are being properly managed and regulatory requirements are satisfied. Overall, the objectives of this Waste Management Plan are to:

- Ensure proper management of E&P and other solid wastes generated at Antero's Colorado locations;
- Provide procedures that facilitate proper waste storage, handling, transportation, recycling and disposal;
- Comply with applicable Colorado Oil and Gas Conservation Commission (COGCC) requirements;
- Comply with applicable Colorado Department of Public Health and Environment solid waste, air, and water requirements.
- Comply with the general intent of the Resource Conservation and Recovery Act (RCRA) "Cradle to Grave" program as applicable to E & P and other solid wastes generated in Colorado;
- Provide information and guidance to Antero personnel to facilitate proper waste management;
- Identify Antero approved disposal facilities;

The following sections provide a description of Antero's wastes, recommended disposal options, waste characterization requirements, waste management procedures, and required documentation.

2.0 WASTE STREAM DESCRIPTIONS AND MANAGEMENT PROCEDURES

Each of Antero's wastes streams has been identified in the following sections. These sections include a description of the waste, waste characterization procedures (if necessary), waste management procedures, and recommended disposal/treatment options. Applicable regulatory citations have been included after each waste description in the event that the requirements need to be further evaluated. Each of the waste stream sections also identifies record keeping requirements where applicable.

2.1 Drill Cuttings

Description

The drill cuttings generated during drilling activities to construct wells are considered an E&P exempt waste. Cuttings usually include subsurface soils and the material is dependent on area geological conditions and the depth of the well. Usually drill cuttings include soils, sands, and rock. Drill cuttings may be used to improve material handling characteristics of sludges and spent drilling muds generated during drilling activities and as materials for well pad perimeter berms. Approximately 300-500 cubic yards of material are generated per well. (COGCC Series 907a, b, f, Table 910-1, Sundry Form 4).

Waste Management Procedures

The waste management procedures for drill cuttings are as follows:

- Store on site within pad perimeter berms minimizing storm water contact;
- Characterize for landfill acceptance as determined by the landfill waste acceptance criteria. Dispose of waste at an "appropriate" facility or apply as beneficial use such as to build pad perimeter berms.
- Document the quantity of waste hauled by the transporter and quantity of waste received for final disposition.

Waste Characterization

To characterize the drill cuttings, a representative sample(s) of the drill cuttings should be collected and sent to an Antero approved laboratory for analyses. Drill cuttings should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-1 – Drill Cuttings Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Benzene (Volatile Organics)	SW846 8260B
Paint Filter Test	SW9095A
Ignitability	SW1030

If cuttings are to be used beneficially or spread on site they should be analyzed for ALL of the analytes listed in COGCC Table 910-1 (Attachment A) to ensure that the soils meet the requirements. If background inorganic compounds including metals are anticipated to be of concern, a background soil sample(s) should also be collected for comparison to the drill cuttings. Background samples should be analyzed consistent with the Table 910-1 requirements for the applicable parameters. Specifically:

- If metals are anticipated to be of concern, an adequate number of samples should be collected to demonstrate to the COGCC's satisfaction that the Table 910-1 level is exceeded by the background level in the native soils. Upon demonstration the background level that was present in the native soils will become the required standard.
- If barium is of concern, analyses for barium will be evaluated using standard EPA SW846 methods (i.e., 3050/6010) rather than the Louisiana Department of Natural Resources (LDNR) "True total Barium" method referenced in Table 910-1.
- If boron is of concern, the analysis will include the Hot Water Soluble Boron only where a crop or plant receptor sensitive to boron is known to be present at the site.

Recommended Disposal/Treatment

The drill cuttings should be disposed in the following manner based on analytical results:

- Beneficially use/spread onsite if the drill cuttings meet ALL applicable Table 910-1 requirements as verified by the above Waste Characterization procedures and approved by the COGCC in advance via Sundry Form 4. If the drill cuttings are to be used beneficially or spread on site, the following requirements should be satisfied:
    1. The soils must meet the concentration levels of COGCC's Table 910-1.
    2. Beneficial use or spreading of drill cuttings shall be performed in a manner so as not to result in the formation of an impermeable barrier.
    3. Only *de minimis* amounts of drill cuttings may be incorporated into the surface materials.
- Dispose in approved County landfill as long as contaminant concentrations are acceptable.
- Dispose at ECDC Landfill if contaminant concentrations exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the appropriate Antero representative or contractor for each volume of drill cuttings generated.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) or approved Sundry Notice Form 4 and returned to Antero's EHS Department.

2.2 Drilling Rubble

Description

Drilling rubble is generated during well construction activities and in most cases is not an E&P exempt waste. Rubble usually includes rocky material and soil spoils generated during pad construction for drilling activities. Drilling rubble can usually be re-incorporated during site reclamation or for onsite landscaping or similar purposes. Approximately 20-100 cubic yards of material are generated per well pad. (COGCC Series 907a, b, f, Table 910-1, Sundry Form 4).

Waste Management Procedures

The waste management procedures for drilling rubble are as follows:

- Store on site within pad perimeter berms minimizing storm water contact and erosion.
- Characterize for final disposition (as necessary and depending on whether off-site disposal is anticipated).
- Dispose of rubble at an appropriate facility or incorporated/re-use material under the conditions described below.
- Document the quantity of waste and final disposition.

Waste Characterization

To characterize the rubble, a representative sample(s) of the material may be collected and sent to an Antero approved laboratory for analyses. If the rubble did not contact any material containing contaminants such as hydraulic oil, condensate, oil, or produced water, sample collection and analysis may not be necessary. If the rubble did not contact any contaminants the waste characterization should document this information. If the rubble did contact E&P wastes, fuel, hydraulic fluids, or other chemicals a representative sample should be collected and analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-2 - Drilling Rubble Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Benzene (Volatile Organics)	SW846 8260B

If rubble contacted E&P wastes and are to be incorporated on site they should be analyzed for ALL of the analytes listed in COGCC Table 910-1 (Attachment A) to ensure that the soils meet the requirements. If background inorganic compounds including metals are anticipated to be of concern, a background soil sample(s) should also be collected for comparison to the rubble. Background samples should be analyzed consistent with the Table 910-1 requirements for the applicable parameters. Specifically:

- If metals are anticipated to be of concern, an adequate number of samples should be collected to demonstrate to the COGCC's satisfaction that the Table 910-1 level is exceeded by the background level in the native soils. Upon demonstration the background level that was present in the native soils will become the required standard.
- If barium is of concern, analyses for barium will be evaluated using standard EPA SW846 methods (i.e., 3050/6010) rather than the Louisiana Department of Natural Resources (LDNR) "True total Barium" method referenced in Table 910-1.
- If boron is of concern, the analysis will include the Hot Water Soluble Boron only where a crop or plant receptor sensitive to boron is known to be present at the site.

Recommended Disposal/Treatment

The drilling rubble should be disposed in the following manner based on analytical results:

- Incorporate onsite if the rubble did not contact E&P wastes or any other chemical or if the rubble meets ALL applicable Table 910-1 requirements and approved by COGCC via Sundry Form 4.
- Dispose in approved County landfill as long as contaminant concentrations are acceptable.
- Dispose at ECDC Landfill if contaminant concentrations exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements (If Applicable)

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the appropriate Antero representative or contractor for drilling rubble generated at each pad.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) or approved Sundry Notice Form 4 and returned to Antero's EHS Department.

2.3 Drilling Waste Concrete

Description

Drilling waste concrete is generated when concrete is pumped down hole and excess concrete returns to the surface during well construction activities. Drilling waste concrete that was used down hole is an E&P exempt waste. Waste concrete is typically placed in specially dug pits to contain excess concrete and other wastes generated from concrete pouring activities associated with well construction. Waste concrete can be buried on site with landowner and COGCC

approval as long as the material has not been contaminated. Approximately 5-20 cubic yards of material are generated per well pad. (COGCC Series 907a, b, d, f, Table 910-1, Sundry Form 4).

Waste Management Procedures

The waste management procedures for waste concrete are as follows:

- Store on site minimizing storm water contact.
- Characterize for final disposition (as necessary and depending on whether off-site disposal is anticipated).
- Dispose of waste on site (with landowner and COGCC approval) or at an appropriate facility based on the waste characterization.
- Document the quantity of waste and final disposition.

Waste Characterization

To characterize the concrete waste, a representative sample(s) of the material maybe collected and sent to an Antero approved laboratory for analyses. If the concrete waste did not contact any material containing contaminants such as hydraulic oil, condensate, oil, or produced water, sample collection and analysis may not be necessary. If the waste did not contact any contaminants the waste characterization should document this information. If the concrete waste did contact E&P wastes a representative sample should be collected and analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-3 – Drilling Concrete Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Benzene (Volatile Organics)	SW846 8260B

If concrete waste contacted contaminants and are to be incorporated on site they should be analyzed for ALL of the analytes listed in COGCC Table 910-1 (Attachment A) including metals, sodium adsorption ratio, pH, and electrical conductivity to ensure that the concrete waste meets the requirements.

Recommended Disposal/Treatment

The concrete waste should be disposed in the following manner based on analytical results:

- Bury onsite if the concrete waste did not contact contaminants or if the waste meets ALL applicable Table 910-1 requirements. If the drilling waste concrete is to be used or buried on site, the following requirements should be satisfied:
  1. The concrete must meet the concentration levels of COGCC's Table 910-1.
  2. Beneficial use or burial of the drilling waste concrete shall be performed in a manner so as not to result in the formation of an impermeable barrier.
- Dispose in approved County landfill as long as contaminant concentrations are acceptable.

- Dispose at ECDC Landfill if contaminant concentrations exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the appropriate Antero representative or contractor for concrete waste generated at each pad.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) or approved Sundry Notice Form 4 and returned to Antero's EHS Department.

2.4 Cement Wash and Other Non-Exempt Concrete Wastes

Description

Cement wash and other concrete wastes are generated during construction activities and, unless the concrete was used down hole, is not an E&P exempt waste. Cement wash and other concrete wastes are typically temporarily stored on site pending completion of the construction activities and then managed as solid waste. (COGCC Series 907A.a, b, c).

Waste Management Procedures

The waste management procedures for cement wash and other concrete wastes are as follows:

- Temporarily store on site minimizing storm water contact.
- Characterize for final disposition as a solid waste (as necessary).
- Dispose of waste at an appropriate facility based on the waste characterization.
- Document the quantity of waste and final disposition.

Waste Characterization

To characterize the cement wash and other concrete, a representative sample(s) of the material maybe collected and sent to an Antero approved laboratory for analyses. If the concrete waste did not contact any material containing contaminants such as hydraulic oil, condensate, oil, or produced water, sample collection and analysis may not be necessary. If the waste did not contact any contaminants the waste characterization should document this information. If the concrete waste did contact E&P wastes a representative sample should be collected and analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-4 – Cement Wash and Other Concrete Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Benzene (Volatile Organics)	SW846 8260B

Recommended Disposal/Treatment

The cement wash and other concrete wastes should be disposed in the following manner based on analytical results:

- Dispose in an approved County landfill as long as contaminant concentrations are acceptable.
- Dispose in an approved industrial waste landfill as long as contaminant concentrations are acceptable.
- Dispose in an approved hazardous waste landfill.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the appropriate Antero representative or contractor for cement wash and other concrete waste generated at each pad.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous or Hazardous Waste Manifest (Attachment B) and returned to Antero's EHS Department.

2.5 Drill Site Rubbish & Trash

Description

Drill site rubbish and trash is generated during well construction activities and includes the waste materials generated and placed in the trash bins and steel bins located on the site. These wastes are non E&P wastes and may include trash, garbage, broken equipment, paper, used empty containers, and other discarded solid waste. The waste collected in trash bins and steel bins should not include used or discarded chemicals, hazardous waste, or universal wastes such as batteries. Drill site rubbish and trash are managed and regulated as solid waste. (COGCC Series 907A, 1203A).

Waste Management Procedures

The waste management procedures for drill site rubbish and trash are as follows:

- Collect in bear-proof dumpsters as required by COGCC in black bear habitat.

- Dispose of by waste contractor.

Waste Characterization
Not applicable.

Recommended Disposal/Treatment
Non-E&P solid waste should be disposed in the following manner:

- Dispose in approved County landfill.

Recordkeeping and Other Requirements
Not applicable.

2.6 Drilling Mud

Description
Drilling muds are used during drilling activities and are reused to the maximum extent possible until the material no longer exhibits the required performance characteristics. Muds are stored in tanks and are pumped down well holes to facilitate maintaining well structure during drilling activities. Drilling muds that cannot be reused for other drill activities are E&P exempt wastes. Drilling mud wastes usually include mud matrix with a number of additives that can include proprietary additives, oils, diesel, and other chemicals. Occasionally drilling muds are mixed with drill cuttings to improve material handling characteristics. Approximately 600 bbls of drilling mud is used per well and re-used on other wells pending the required characteristics. Mud that cannot be re-used is disposed. (COGCC Series 907a, b, e, Table 910-1, Sundry Form 4).

Waste Management Procedures
The waste management procedures for drilling muds are as follows:

- Store on site in tanks minimizing storm water contact.
- Characterize for landfill acceptance (as necessary). If applicable muds have already been characterized this step may not be necessary.
- Dispose of waste at an "appropriate" facility based on the analytical results.
- Document the quantity of waste hauled by the transporter and quantity of waste received for final disposition.

Waste Characterization
To characterize the drilling muds, a representative sample(s) of the mud should be collected and sent to an Antero approved laboratory for analyses. Drilling muds should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-6 – Drilling Mud Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Benzene (Volatile Organics)	SW846 8260B
Metals (TCLP)	SW846 1311
Ignitability	SW1030
Paint Filter Test	SW90935A

If drilling muds are to be used beneficially or spread on site they should be analyzed for ALL of the analytes listed in COGCC Table 910-1 (Attachment A) to ensure that the soils meet the requirements. If background inorganic compounds including metals are anticipated to be of concern, a background soil sample(s) should also be collected for comparison to the drilling mud. Background samples should be analyzed consistent with the Table 910-1 requirements for the applicable parameters. Specifically:

- If metals are anticipated to be of concern, an adequate number of samples should be collected to demonstrate to the COGCC's satisfaction that the Table 910-1 level is exceeded by the background level in the native soils. Upon demonstration the background level that was present in the native soils will become the required standard.
- If barium is of concern, analyses for barium will be evaluated using standard EPA SW846 methods (i.e., 3050/6010) rather than the Louisiana Department of Natural Resources (LDNR) "True total Barium" method referenced in Table 910-1.
- If boron is of concern, the analysis will include the Hot Water Soluble Boron only where a crop or plant receptor sensitive to boron is known to be present at the site.

Recommended Disposal/Treatment

The drill cuttings should be disposed in the following manner based on analytical results:

- Beneficially use/spread onsite if the drilling muds meet ALL applicable Table 910-1 requirements. If the drill cuttings are to be used beneficially or spread on site, the following requirements should be satisfied:
  1. The soils must meet the concentration levels of COGCC's Table 910-1.
  2. Beneficial use or spreading of drill cuttings shall be performed in a manner so as not to result in the formation of an impermeable barrier.
  3. Only *de minimis* amounts of drill cuttings may be incorporated into the surface materials.
- Dispose in approved County landfill as long as contaminant concentrations are acceptable.
- Dispose at ECDC Landfill if contaminant concentrations exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information should be documented by the contractor for drilling muds that can no longer be recycled.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) or approved Sundry Notice Form 4 and returned to the Antero's EHS Department.

2.7 Bentonitic Drilling Fluids

Description

Water based bentonitic drilling fluids are used during drilling activities and are reused to the maximum extent possible until the material no longer has the required characteristics. Bentonitic drilling fluids are stored in tanks and are pumped down well holes to facilitate maintaining well structure during drilling activities. Drilling fluids that cannot be reused for other drill activities are E&P exempt wastes. (COGCC Series 907d, Table 910-1).

Waste Management Procedures

The waste management procedures for bentonitic drilling fluids are as follows:

- Store in frac tanks on site within pad perimeter berms minimizing spills and storm water contact;
- Drying and burial in pits on non-crop land (COGCC Series 907d(3)a);
- Characterize for landfill acceptance (as necessary). If a well at the same pad has already been characterized this step may not be necessary.
- Dispose of waste at an "appropriate" facility based on the analytical results.
- Document the quantity of waste and final disposition.

If the bentonitic drilling fluids are to be applied/spread on site for land application, the following requirements should be satisfied:

1. The average thickness of water-based bentonitic drilling fluid waste applied must not be more than three (3) inches prior to incorporation.
2. Application of the waste shall be done in a manner to prevent ponding or erosion.
1. The waste must be incorporated as a beneficial amendment into the native soils within ten (10) days of application.
2. The resulting soil concentrations must not exceed the COGCC's Table 910-1 levels.
3. Written authorization must be obtained from the surface owner prior to land application.
4. A record of waste generator information should be maintained that includes source, volume, location where land application occurred.
5. Antero will retain responsibility for the land application.
6. Prior approval from COGCC Director is not required for reuse of water-based bentonitic drilling fluids for land application as a soil amendment.

Waste Characterization

To characterize the bentonitic drilling fluids, a representative sample(s) of the material should be collected and sent to an Antero approved laboratory for analyses. Bentonitic drilling fluids should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-7 – Bentonitic Drilling Fluid Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Benzene (Volatile Organics)	SW846 8260B
Paint Filter Test	SW9095A
Ignitability	SW1030

If bentonitic drilling fluids are to be used beneficially or spread on site as a soil amendment they should be analyzed for ALL of the analytes listed in COGCC Table 910-1 (Attachment A) to ensure that the soils meet the requirements. If background inorganic compounds including metals are anticipated to be of concern, a background soil sample(s) should also be collected for comparison to the amended soil. Background samples should be analyzed consistent with the Table 910-1 requirements for the applicable parameters. Specifically:

- If metals are anticipated to be of concern, an adequate number of samples should be collected to demonstrate to the COGCC's satisfaction that the Table 910-1 level is exceeded by the background level in the native soils. Upon demonstration the background level that was present in the native soils will become the required standard.
- If barium is of concern, analyses for barium will be evaluated using standard EPA SW846 methods (i.e., 3050/6010) rather than the Louisiana Department of Natural Resources (LDNR) "True total Barium" method referenced in Table 910-1.
- If boron is of concern, the analysis will include the Hot Water Soluble Boron only where a crop or plant receptor sensitive to boron is known to be present at the site.

Recommended Disposal/Treatment

The water-based bentonitic drilling fluids should be disposed in the following manner based on analytical results:

- Beneficially use/spread onsite if the application of the bentonitic drilling fluids/soil mixture meets ALL applicable Table 910-1 requirements.
- Dispose in an approved County landfill as long as contaminant concentrations are acceptable and the waste type is not prohibited.
- Dispose at ECDC Landfill if contaminant concentrations exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the contractor for each volume of bentonitic drilling fluids generated.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) and returned to Antero's EHS Department.

2.8 Flowback Water

Description

Flowback water is generated from well fracing and testing activities and is an E&P exempt waste. Flowback fluids include a mixture of sands, solids, water and condensate and are separated upon exiting the subject well. Flowback water is directed to large tanks for storage. Well site frac and flowback tanks are provided with secondary containment structures to prevent spills from leaving the well pads. Flowback waters are then directed to the water management system where the water is treated and then stored or disposed via injection wells. Contaminants are removed from the flowback water so the water may be reused as frac water. Useable water is stored for future frac operations in well site frac tanks and at the Wasatch Bench Water Management Pond. Flowback water that is not needed or not useable is disposed into Antero's injection wells. Approximately 10,000 to 60,000 bbl per well of flowback water are generated per fracing activity. (COGCC Series 325Series 907a, b, c, d, e).

Waste Management Procedures

The waste management procedures for flowback water are as follows:

- Store on site in frac tanks provided with secondary containment.
- Direct flowback water into the Water Management System for treatment, storage and reuse or disposal.
- Records are kept for flowback water sent to Antero's injection wells in accordance to the company's COGCC injection well permits.
- Document the quantity of flowback water generated for final offsite disposition (flowback water not reused or injected).

Waste Characterization

Not applicable although water characterization is routinely conducted to support operations.

Recommended Disposal/Treatment
The flowback water should be disposed in the following manner:

- Place into the Water Management System.
- Treat and store for reuse as frac water.
- Treat and/or direct to injection wells for disposal.

Recordkeeping for Offsite Disposal
Antero maintains a database for the flowback water sent offsite for final disposal at a licensed third party disposal facility. To ensure the appropriate information is tracked, the following information will be documented by the contractor for flowback wastewater generated from each fracing activity.

- Quantity of wastewater;
- Date of transport;
- Name of transporter;
- Location of wastewater pickup;
- Name and location of treatment or disposal site;
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) and returned to the Antero's EHS Department.

2.9 Fracing and Flowback Sands & Solids

Description
Fracing and flowback sands and solids are generated from fracing activities and are E&P exempt waste except for those that contain radioactive tracer wastes. Flowback fluids include a mixture of sands, solids, water and condensate that are separated upon exiting the subject well. Fracing and flowback sands and solids are directed to large tanks for temporary storage. These tanks are provided with secondary containment structures to prevent spills from leaving the well pads. Fracing and flowback sands and solids include sands, recovered solids, and oil/condensate. (COGCC Series 907a, b, d, e, f).

Fracing and flowback sands and solids that contain radioactive tracer materials are not E&P exempt wastes. These wastes must be managed through the Colorado Department of Public Health and Environment (CDPHE) Hazardous Materials and Waste Management Division Radiation Program. Antero's EHS Department should be contacted prior to use of these materials and the generation of these types of wastes to ensure proper management and disposal.

Waste Management Procedures
The waste management procedures for frac sands and solids are as follows:

- Contact Antero's EHS Department prior to using radioactive tracer materials. Antero EHS Department will identify specific waste management and record keeping procedures based on the material used, manufacturer certifications, CDPHE recommendations.
- Store on site in tanks minimizing storm water contact and potential releases.
- Characterize for landfill acceptance (as necessary). If a well at the same pad has already been characterized this step may not be necessary.

- Dispose of waste at a licensed disposal facility based on the waste profile analytical results.
- Document the quantity of waste hauled by the transporter and quantity of waste received for final disposition.

Waste Characterization

To characterize the frac sands and solids, a representative sample(s) of waste should be collected and sent to an Antero approved laboratory for analyses. Frac sands and solids should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-9 – Fracing and Flowback Sands and Solids Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Volatile Organics	SW846 8260B
TCLP Metals	SW846 1311
Paint Filter Test	SW90956A
Ignitability	SW1030

Recommended Disposal/Treatment

The fracing and flowback sands and solids should be disposed in the following manner based on analytical results:

- Dispose at ECDC Landfill. Contaminant concentrations typically exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information should be documented by the contractor for each batch of fracing and flowback sands generated.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) and returned to the Antero's EHS Department.

2.10 Flowback and Frac Tank Oil

Description

Flowback and frac tank oil is skimmed off of flowback and frac water generated from well fracing and testing activities and is an E&P exempt waste. . Flowback and frac tank oil should be separated from the frac fluids and skimmed off of flowback and frac water. Recovered oil should be placed in site condensate tanks for sales. (COGCC Series 907a, b, d, e).

Waste Management Procedures

The following are the waste management procedures for frac tank and flowback oil:

- Recover and separate oil from frac and flowback waters
- Store in site Condensate Sales tanks within lined corrugated steel containment and pad perimeter berms.

Waste Characterization

Not applicable.

Recommended Disposal/Treatment

Not applicable. Condensate sold.

Recordkeeping and Other Requirements

Not applicable. Condensate is sold and recorded as production.

2.11 Completion Rubbish & Trash

Description

Completion rubbish and trash is generated during well completion activities and includes the waste materials generated and placed in the trash bins and steel bins located on the site. These wastes are non E&P wastes and may include trash, garbage, broken equipment, paper, used empty containers, and other discarded solid waste. The waste collected in trash bins and steel bins should not include used or discarded chemicals, hazardous waste, or universal wastes such as batteries. Completion rubbish and trash are managed and regulated as solid waste. (COGCC Series 907A, 1203A).

Waste Management Procedures

The following are the waste management procedures for completion rubbish and trash:

- Collect in bear-proof dumpsters as required in COGCC in black bear habitat;
- Dispose of waste by contractor.

Waste Characterization

Not applicable.

Recommended Disposal/Treatment

Non-E&P solid waste should be disposed in the following manner:

- Dispose in approved County landfill.

Recordkeeping and Other Requirements
Not applicable.

2.12 Midstream/Gathering – Pipeline Construction Wastes (Pipes/Trimmings)

Description
Midstream/Gathering – Pipeline Construction Wastes such as scrape pipes and trimmings are generated during pipeline construction and installation activities. Construction wastes generated are placed in the trash bins and steel bins on the site. These wastes are non E&P wastes and may include scrap pipes, fittings, pipe trimmings and other misc construction debris. The waste collected in trash bins and steel bins should not include used or discarded chemicals, hazardous waste, or universal wastes such as batteries. Construction wastes are managed and regulated as solid waste. (COGCC Series 907A).

Waste Management Procedures
The following are the waste management procedures for construction wastes:

- Gather pipe material, fittings, and scrap for salvage.
- Store construction wastes in covered secure trash bins;
- Dispose and recycle wastes using a contractor.

Waste Characterization
Not applicable.

Recommended Disposal/Treatment
Non-E&P solid waste should be disposed in the following manner:

- Salvage recyclable materials.
- Dispose in approved County landfill.

Recordkeeping and Other Requirements
Not applicable.

2.13 Midstream/Gathering – Pipeline Pressure Testing Hydraulic Water

Description
Midstream/Gathering pipeline pressure testing hydraulic water is generated during gas and water pipeline hydraulic testing activities to identify leaks. These waste waters can be E&P wastes depending on the pipeline system being tested. (COGCC Series 907a, b, c, CDPHE General Permit COG 604000, Sundry Form 4).

Waste Management Procedures
The following are the waste management procedures for used hydraulic testing water:

- Obtain samples of the source water.
- Obtain general discharge permit from CDPHE for discharge of test water.
- Collect samples of discharged water.
  OR
- Direct test water to Water Management System for disposal in the injection wells.

- Document the volume of water and final disposition.

Waste Characterization

Table 2-13 – Pipeline Pressure Testing Hydraulic Water Management Analyses

Parameters	Method
Applicable Colorado Water Quality Stream Standards	To be determined based on applicable stream standards.

Recommended Disposal/Treatment

Hydraulic testing water should be:

- Discharged under the General Permit

OR.

- Directed to the Water Management System for reuse or disposal in the injection well.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the appropriate Antero representative or contractor for any hydraulic testing water generated.

- Facility location;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste generation;
- Name and location of treatment, disposal site, or discharge point;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on a discharge monitoring report specified under the General Permit or recorded on the Non-Hazardous Waste Manifest (Attachment B) and returned to the Antero's EHS Department.

2.14 Midstream/Gathering- Pigging Wastes

Description

Pigging wastes are generated from cleaning and removing liquids and solids that accumulate in the natural gas gathering pipelines. These wastes are E&P exempt waste and can include condensate, water, emulsified oils, paraffins, sludges, and other solids. Pigging wastes are separated and stored in tanks pending disposal, injection, or sales. (COGCC Series 907a, b, e, f).

Waste Management Procedures

The following are the waste management procedures for pigging wastes:

- Collect and separate pigging wastes.

- Store sludges, and water in tanks with secondary containment to minimize potential releases.
- Store condensate and oil in tanks with secondary containment pending sales.
- Direct wastewater from pigging operations to Water Management System.
- Characterization of pigging sludges and solids for landfill acceptance;
- Dispose of pigging waste at an "appropriate" facility based on the waste profile analytical results.
- Document the quantity of waste hauled by the transporter and quantity of waste received for final disposition

Waste Characterization

To characterize the pigging sludges and solids, a representative sample(s) of waste should be collected and sent to an Antero approved laboratory for analyses. Pigging sludges and solids should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-14 Pigging Sludges and Solids Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Volatile Organics	SW846 8260B
TCLP Metals	SW846 1311
Ignitability	SW9095A

Recommended Disposal/Treatment

The pigging wastes should be disposed in the following manner based on the type of waste and analytical results:

- Direct pigging wastewater to the Water Management System for disposal in the injection wells.
- Sell condensate and oil.
- Dispose of pigging sludges and solids at ECDC Landfill. Contaminant concentrations typically exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the appropriate Antero representative or contractor for pigging wastes generated during cleaning and maintenance activities.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;

- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) and returned to the Antero's EHS Department.

2.15 Produced Water

Description

Produced water is generated during natural gas and condensate production and is an E&P exempt waste. Produced water can contain small amounts of condensate and tends to have elevated concentrations of total dissolved solids due to salts. Produced water is directed to large tanks for storage and these tanks are contained within corrugated steel containment structures that provide secondary containment. Produced water is pumped or trucked into the Water Management System for treatment, storage, reuse and disposal. Once the produced water is in the system, it is directed to the Wasatch Bench Facility for treatment and storage. Produced water is stored in the Wasatch Pond for fracing operations. If the water is not needed or useable it is disposed in Antero's injection wells. (COGCC Series 907a, b, c).

Waste Management Procedures

The following are the waste management procedures for produced water:

- Store on site in water tanks provided with corrugated steel secondary containment.
- Direct produced water into the Water Management System (via trucking or pumping) for treatment, storage and reuse or disposal.
- Document the quantity of produced water generated and final disposition. The Water Management System meters water as it enters the system and as it is removed for fracing or injected.

Waste Characterization

Not applicable although water characterization is conducted to document air emissions from the Wasatch Water Management Pond.

Recommended Disposal/Treatment

The produced water should be disposed in the following manner:

- Place into the Water Management System.
- Treat and store for reuse as frac water.
- Treat and/or direct to injection wells for disposal.

Recordkeeping for Offsite Disposal

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by Antero personnel or the contractor for produced water generated from each pad site.

- Quantity of waste;
- Date of transport;
- Identify of transporter;

- Location of waste pickup;
- Name and location of treatment or disposal site;
- Obtain transporter signatures for records.

This information is recorded in the production reports. Water volumes generated from each pad and injected in the disposal wells are tracked in the Water Management System.

2.16 Production and Frac/Flowback Tank Sludges and Separator Sludges

Description

Production tank sludges from produced water and condensate tanks, frac/flowback tank sludges and well head separator sludges accumulate at the bottom of these vessels over time. These sludges can contain high concentrations of hydrocarbons and solids and are considered an E&P exempt waste (COGCC Series 907a, b, d, and f).

Waste Management Procedures

The following are the waste management procedures for production tank, frac/flowback tank and separator tank bottom sludges:

- Remove sludges from tanks;
- Store sludges in tanks/containers within secondary containment minimizing storm water contact and potential releases;
- Characterize per landfill waste acceptance criteria;
- Dispose of waste at an "appropriate" facility based on the waste profile analytical results.
- Document the quantity of waste hauled by the transporter and quantity of waste received for final disposition.

Waste Characterization

To characterize the tank bottom sludges, a representative sample(s) of waste should be collected and sent to an Antero approved laboratory for analyses. Tank bottom sludges should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-16 – Tank Bottom Sludge Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Volatile Organics	SW846 8260B
TCLP Metals	SW846 1311
Ignitability	SW1030

Recommended Disposal/Treatment

The tank bottom sludges should be disposed in the following manner based on analytical results:

- Dispose at ECDC contaminant concentrations typically exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by the appropriate Antero representative or contractor for tank bottom sludges as they are generated for shipment offsite.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) and returned to the Antero's EHS Department.

2.17 Wasatch Bench Pond Sludges & Solids

Description

Wasatch Bench Pond Sludges & Solids are generated occasionally from cleaning and maintenance activities. These sludges and solids are E&P exempt waste and can include condensate, water, emulsified oils, paraffins, sludges, and other solids. Wasatch Bench Pond sludges and solids may be separated and stored in tanks pending disposal, injection, or sales depending on the waste recovered. (COGCC Series 907a, b, e, f).

Waste Management Procedures

The following are the waste management procedures for Wasatch Bench pond sludges and solids:

- Collect/skim and separate the pond sludges and solids.
- Store sludges, and water in tanks with secondary containment to minimize potential releases.
- Store recovered condensate and oil in tanks with secondary containment pending sales.
- Direct separated water to Water Management System.
- Characterize the sludges and solids for landfill acceptance;
- Dispose of the sludges and solid waste at an "appropriate" facility based on the waste profile analytical results.
- Document the quantity of waste and final disposition.

Waste Characterization

To characterize the sludges and solids, a representative sample(s) of waste should be collected and sent to an Antero approved laboratory for analyses. Pond sludges and solids should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2-17 - Pigging Sludges and Solids Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Volatile Organics	SW846 8260B
TCLP Metals	SW846 1311
Ignitability	SW1030

Recommended Disposal/Treatment

The pond sludges and solids should be disposed in the following manner based on the type of waste and analytical results:

- Direct water to the Water Management System for disposal in the injection wells.
- Sell condensate and oil.
- Dispose of pond sludges and solids at ECDC Landfill. Contaminant concentrations typically exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented by Antero personnel or the contractor for pond sludges and solids generated during cleaning and maintenance activities.

- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- Obtain transporter signatures for records.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) and returned to the Antero's EHS Department.

2.18 Spills – Contaminated Soils & Media

Description

Produced water and condensate spills occasionally occur and are E&P exempt wastes. Soils and media impacted by these spills can contain elevated levels of hydrocarbons, metals and salts. (COGCC Series 906, 907a, b, f, 909,910, Table 910-1, Sundry Form 19, 27 and 4).

Waste Management Procedures

The following are the waste management procedures for contaminated soils and media:

- Notify SPCC Response Coordinator (See SPCC/Contingency Plan).
- Stop the leak if this can be achieved safely.
- Prevent migration of leak.
- Notify Federal, State, and local government agencies as required.

- Develop a remediation plan according to COGCC Series 909 and 910, submit Form 27 if necessary.
- Characterize site or remove impacted soils & media;
- Store impacted soils & media on site within pad perimeter berms minimizing storm water contact;
- Characterize waste for landfill acceptance (as necessary).
- Dispose of waste at an "appropriate" facility based on the analytical results.

OR

- Spread soil on site for treatment and beneficial use.
- Document the quantity of waste and final disposition.

Waste Characterization

To characterize the impacted soil and media, a representative sample(s) of the material should be collected and sent to an Antero approved laboratory for analyses. Impacted soils should be analyzed for the following parameters. Additional parameters may be necessary depending on the disposal facility's waste acceptance criteria and the final disposition of the waste.

Table 2- 18 – Contaminated Soils & Media Waste Management Analyses

Parameters	Method
Volatile TPH (GRO)	SW846 8015B
Semi-Volatile TPH (DRO	SW846 8015
Benzene (Volatile Organics)	SW846 8260B

If impacted soils are to be used beneficially or spread on site they should be analyzed for ALL of the analytes listed in COGCC Table 910-1 (Attachment A) to ensure that the soils meet the requirements. If background inorganic compounds including metals are anticipated to be of concern, a background soil sample(s) should also be collected for comparison to the contaminated soils and media wastes. Background samples should be analyzed consistent with the Table 910-1 requirements for the applicable parameters. Specifically:

- If metals are anticipated to be of concern, an adequate number of samples should be collected to demonstrate to the COGCC's satisfaction that the Table 910-1 level is exceeded by the background level in the native soils. Upon demonstration the background level that was present in the native soils will become the required standard.
- If barium is of concern, analyses for barium will be evaluated using standard EPA SW846 methods (i.e., 3050/6010) rather than the Louisiana Department of Natural Resources (LDNR) "True total Barium" method referenced in Table 910-1.

If boron is of concern, the analysis will include the Hot Water Soluble Boron only where a crop or plant receptor sensitive to boron is known to be present at the site.

Recommended Disposal/Treatment

The impacted soils should be disposed in the following manner based on analytical results:

- Beneficially use/spread onsite if the soils meet ALL applicable Table 910-1 requirements and the activity is approved by COGCC via Sundry Form 4. . If the drill cuttings are to be used beneficially or spread on site, the following requirements should be satisfied:

1. The soils must meet the concentration levels of COGCC's Table 910-1.
2. Beneficial use or spreading of drill cuttings shall be performed in a manner so as not to result in the formation of an impermeable barrier.
3. Only *de minimis* amounts of drill cuttings may be incorporated into the surface materials.

- Dispose in approved County landfill as long as contaminant concentrations are acceptable.
- Dispose at ECDC Landfill if contaminant concentrations exceed acceptable County landfill requirements.

Recordkeeping and Other Requirements

Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information will be documented for impacted soils generated from spill cleanup activities.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location;
- Obtain transporter signatures for records; and
- Sensitive area analysis.

This information is recorded on the Non-Hazardous Waste Manifest (Attachment B) or approved Sundry Notice Form 4 and returned to the Antero's EHS Department.

2.19 Miscellaneous Spill and Routine Operation Wastes

Description

Miscellaneous spill and routine operation wastes are generated on an ongoing basis and include oil rags, spill pads, oil skimming booms and oil diapers. These materials are collected at select sites (Wasatch Bench) in lined covered dumpsters and are managed by contractors specializing in waste management (COGCC Series 907a, b, e, and f).

Waste Management Procedures

The following are the waste management procedures for miscellaneous spill and routine operation oily wastes:

- Store in covered lined secure trash dumpsters;
- Waste is managed and disposed of by contractor.

Waste Characterization

Performed by Contractor.

Recommended Disposal/Treatment
Miscellaneous oily waste should be disposed in the following manner:

- Contractor manages disposal/final disposition of oily wastes in appropriate approved facility.

Recordkeeping and Other Requirements
Antero maintains a data base of all waste generated at their facilities. To ensure the appropriate information is tracked, the following information should be documented by the contractor for the miscellaneous spill and routine operational oil wastes generated.

- Facility location/pad name;
- Type of waste (note if it was combined with other waste);
- Quantity of waste;
- Date of transport;
- Identify of transporter;
- Location of waste pickup;
- Name and location of treatment or disposal site;
- If being used beneficially document use and location; and
- Obtain transporter signatures for records.

This information is recorded by the contractor and provided to the Antero's EHS Department.

2.20 Stormwater BMP Wastes

Description
Stormwater Best Management Practice (BMP) wastes are generated from ongoing stormwater management activities. These wastes include old straw wattles, damaged silt and storm fences, and hay bales. Many of Antero's well pads and access roads include stormwater BMP measures to minimize impacts to surface water and erosion. As the BMPs are damaged or become ineffective they are replaced. The storm water BMP wastes generated are non E&P wastes and must be managed as solid waste (COGCC Series 907A).

Waste Management Procedures
The following are the waste management procedures for stormwater BMP wastes:

- Store in covered secure trash bins and dumpsters.
- Dispose of waste by contractor.

Waste Characterization
Not applicable.

Recommended Disposal/Treatment
Non-E&P solid waste should be disposed in the following manner:

- Dispose in approved County landfill.

Recordkeeping and Other Requirements
Not applicable.

Attachment A
COGCC – Table 910-1

Table 910-1
CONCENTRATION LEVELS[1]

Contaminant of Concern	Concentrations
Organic Compounds in Soil	
TPH (total volatile and extractable petroleum hydrocarbons)	500 mg/kg
Benzene	0.17 mg/kg[2]
Toluene	85 mg/kg[4]
Ethylbenzene	100 mg/kg[2]
Xylenes (total	175 mg/kg[2]
Acenaphthene	1,000 mg/kg[2]
Anthracene	1,000 mg/kg[2]
Benzo(A)anthracene	0.22 mg/kg[2]
Benzo(B)fluoranthene	0.22 mg/kg[2]
Benzo(K)fluoranthene	2.2 mg/kg[2]
Benzo(A)pyrene	0.022 mg/kg[2]
Chrysene	22 mg/kg[2]
Dibenzo(A,H)anthracene	0.022 mg/kg[2]
Fluoranthene	1,000 mg/kg[2]
Fluorene	1,000 mg/kg[2]
Indeno(1,2,3,C,D)pyrene	0.22 mg/kg[2]
Napthalene	23 mg/kg[2]
Pyrene	1,000 mg/kg[2]
Organic Compounds in Ground Water	
Benzene	5 µg/l[3]
Toluene	560 to 1,000 µg/l[3]
Ethylbenzene	700 µg/l[3]
Xylenes (Total)	1,400 to 10,000 µg/l[3,4]
Inorganics in Soils	
Electrical Conductivity (EC)	<4 mmhos/cm or 2x background
Sodium Adsorption Ratio (SAR)	<12[5]
pH	6-9
Inorganics in Ground Water	
Total Dissolved Solids (TDS)	<1.25 x background[3]
Chlorides	<1.25 x background[3]
Sulfates	<1.25 x background[3]
Metals in Soils	
Arsenic	0.39 mg/kg[2]
Barium (LDNR True Total Barium)	15,000 mg/kg[2]
Boron (Hot Water Soluble)	2 mg/l[3]
Cadmium	70 mg/kg[2,6]
Chromium (III)	120,000 mg/kg[2]
Chromium (VI)	23 mg/kg[2,6]
Copper	3,100 mg/kg[2]
Lead (inorganic)	400 mg/kg[2]
Mercury	23 mg/kg[2]
Nickel (soluble salts)	1,600 mg/kg[2,6]
Selenium	390 mg/kg[2,6]
Silver	390 mg/kg[2]
Zinc	23,000 mg/kg[2,6]
Liquid Hydrocarbons in Soils and Ground Water	
Liquid hydrocarbons including condensate and oil	Below detection level

COGCC recommends that the latest version of EPA SW 846 analytical methods be used where possible and that analyses of samples be performed by laboratories that maintain state or national accreditation programs.

[1] Consideration shall be given to background levels in native soils and ground water.
[2] Concentrations taken from CDPHE-HMWMD Table 1 Colorado Soil Evaluation Values (December 2007).
[3] Concentrations taken from CDPHE-WQCC Regulation 41 - The Basic Standards for Ground Water.
[4] For this range of standards, the first number in the range is a strictly health-based value, based on the WQCC's established methodology for human health-based standards. The second number in the range is a maximum contaminant level (MCL), established under the Federal Safe Drinking Water Act which has been

determined to be an acceptable level of this chemical in public water supplies, taking treatability and laboratory detection limits into account. The WQCC intends that control requirements for this chemical be implemented to attain a level of ambient water quality that is at least equal to the first number in the range except as follows: 1) where ground water quality exceeds the first number in the range due to a release of contaminants that occurred prior to September 14, 2004 (regardless of the date of discovery or subsequent migration of such contaminants) clean-up levels for the entire contaminant plume shall be no more restrictive than the second number in the range or the ground water quality resulting from such release, whichever is more protective, and 2) whenever the WQCC has adopted alternative, site-specific standards for the chemical, the site-specific standards shall apply instead of these statewide standards.

[5] Analysis by USDA Agricultural Handbook 60 method (20B) with soluble cations determined by method (2). Method (20B) = estimation of exchangeable sodium percentage and exchangeable potassium percentage from soluble cations. Method (2) = saturated paste method (note: each analysis requires a unique sample of at least 500 grams). If soils are saturated, USDA Agricultural Handbook 60 with soluble cations determined by method (3A) saturation extraction method.

[3] The table value for these inorganic constituents is taken from the CDPHE-HMWMD Table 1 Colorado Soil Evaluation Values (December 2007). However, because these values are high, it is possible that site-specific geochemical conditions may exist that could allow these constituents to migrate into ground water at levels exceeding ground water standards even though the concentrations are below the table values. Therefore, when these constituents are present as contaminants, a secondary evaluation of their leachability must be performed to ensure ground water protection.

Attachment B
Non-Hazardous Waste Manifest

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.	Manifest Doc. No.	2. Page 1 of

GENERATOR

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name	6. US EPA ID Number	A. Transporter's Phone
7. Transporter 2 Company Name	8. US EPA ID Number	B. Transporter's Phone
9. Designated Facility Name and Site Address	10. US EPA ID Number	C. Facility's Phone

11. Waste Shipping Name and Description	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a.				
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above	E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

Printed by J.J. KELLER & ASSOCIATES, INC.
Neenah, WI 54957-0368

ORIGINAL – RETURN TO GENERATOR

8-98

Attachment C
Antero Approved Laboratories

Table C-1 – Antero Approved Laboratories

Laboratories	Phone Number
Accutest Laboratories 4036 Youngfield Street Wheat Ridge, CO 80033	303-425-6021
ALS Environmental 225 Commerce Drive Ft. Collins, Colorado 80524	970-490-1511
Summit Scientific 741 Corporate Circle Golden, CO	303-277-9310
Key Laboratories 2479 Riverside Parkway Grand Junction, CO	970-243-5311

Attachment D
Antero Approved Disposal Facilities

Table D-1 – Antero Approved Disposal Facilities

Disposal Facilities	Phone Number
CB Industries –Delta CO 1129 24 Road Grand Junction, CO 81505-9639	970-640-5028
South Canyon Landfill – Glenwood Springs, CO 1205 CR 134 Glenwood Springs, CO 81601	970-945-5375
Western Garfield County Landfill- Rulison, CO 0075 CR 246 Rifle, CO 81650	970-625-2516
ECDC Landfill – Utah 10500 S. 1300 West South Jordon, UT 84095-8509	801-253-1111
Eagle County Landfill – Wolcott, CO 815 Ute Creek road Colorado 81655	970-328-3470

FORM 19 Rev 6/99

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109

FOR OGCC USE ONLY

Received 6/5/2012 Rifle COGCC

Spill report taken by:

FACILITY ID:

SPILL/RELEASE REPORT

This form is to be submitted by the party responsible for the oil and gas spill or release. Any spill or release which may impact waters of the State must be reported as soon as practicable; any spill over 20 bbls must be reported within 24 hours and all spills over five bbls must be reported within ten days. Submit a Site Investigation and Remediation Workplan (Form 27) when requested by the Director.

OPERATOR INFORMATION

Name of Operator: Antero Resources Piceance Corporation OGCC Operator No: 10079

Address: 1625 17th Street

City: Denver State: CO Zip: 80203

Contact Person: Gerard G. Alberts

Phone Numbers

No: 303-357-7310

Fax: 303-357-7315

E-Mail: jalberts@anteroresources.com

DESCRIPTION OF SPILL OR RELEASE

Date of Incident: 5/26/2012 Facility Name & No.: Robinson A Pad #336015

Type of Facility (well, tank battery, flow line, pit): Tank Battery

Well Name and Number: Robinson #A3

API Number: 05-045-13935

County: Garfield

QtrQtr: SWSW Section: 8

Township: 6S Range: 92W

Meridian: 6th

Specify volume spilled and recovered (in bbls) for the following materials:

Oil spilled: 0.085 Oil recov'd: 0.085 Water spilled: 87 Water recov'd: 87 Other spilled: 0 Other recov'd: 0

Ground Water impacted? ☐ Yes ☑ No Surface Water impacted? ☐ Yes ☑ No

Contained within berm? ☑ Yes ☐ No Area and vertical extent of spill: ~4065 sq ft x ~4"

Current land use: Sand and gravel mining operations; Oil and gas operations Weather conditions: Cloudy, 60 degrees

Soil/geology description: Halaquepts, nearly level; Wann sandy loam, 1 to 3 percent slopes

IF LESS THAN A MILE, report distance IN FEET to nearest.... Surface water: 220.7 wetlands: 20 buildings:

Livestock: water wells: 1424.5 Depth to shallowest ground water: 80

Cause of spill (e.g., equipment failure, human error, etc.): Human error, equipment failure Detailed description of the spill/release incident:

On May 26, 2012 at 7 pm on the Robinson A pad approximately 87 bbls of water overflowed from temporary water tanks on site (80% freshwater; 20% produced water). Possible causes include high water levels in the tank due to gas breakthrough into temporary water tanks and delayed arrival of daily pumper to the site. All water was contained on site and vac truck was immediately called to remove 87 bbls of water and saturated soil.

CORRECTIVE ACTION

Describe immediate response (how stopped, contained and recovered):

Vac truck was immediately called and recovered 87 bbls, both produced and stormwater. Saturated soil was removed for further remediation.

Describe any emergency pits constructed:

NA

How was the extent of contamination determined:

Field personnel using Trimble GPS.

Further remediation activities proposed (attach separate sheet if needed):

Microblaze will be applied to excavated soil. Confirmation samples will be taken prior to replacing the soil.

Describe measures taken to prevent problem from reoccurring:

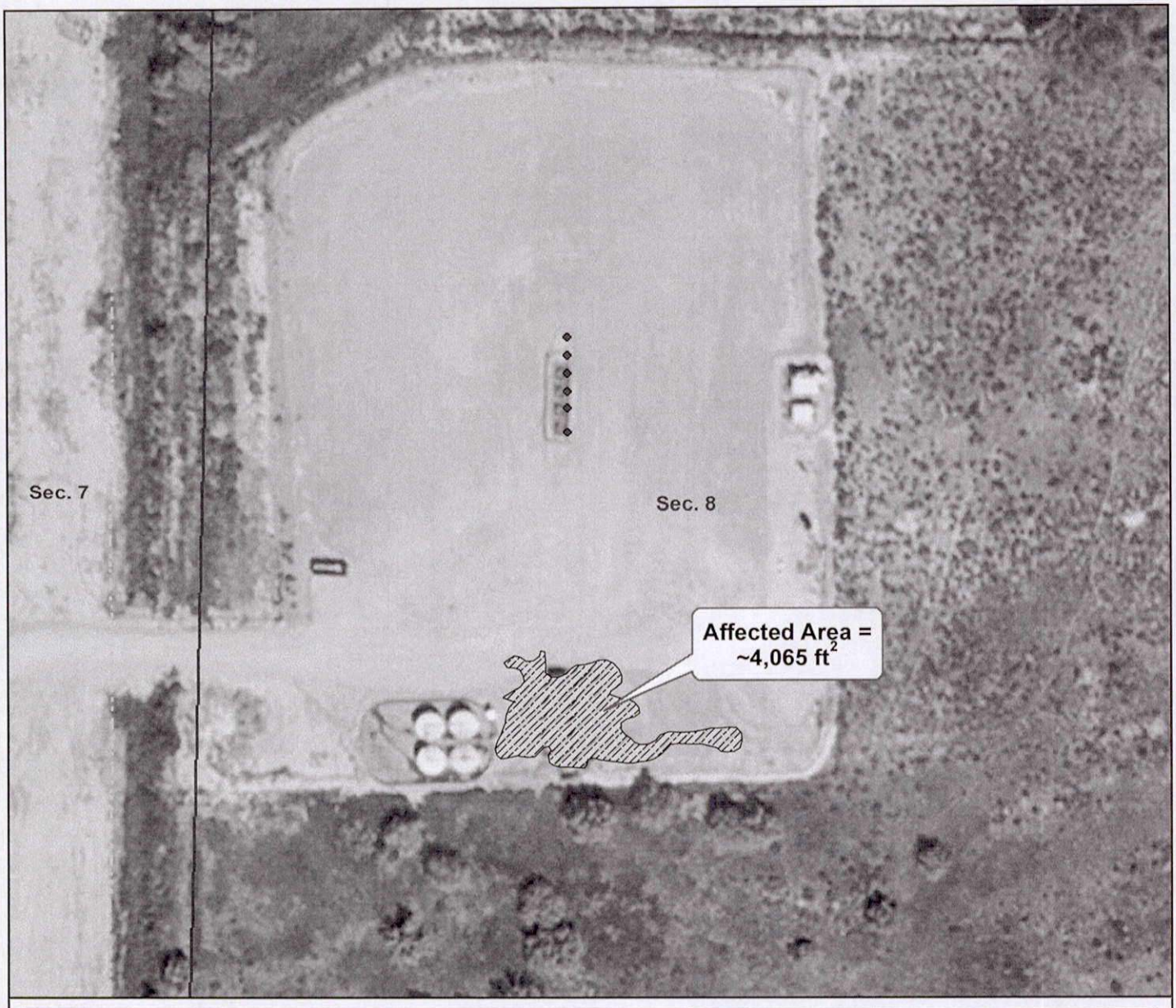
Additional tanks have been added to the temporary facility. Tank levels are closely monitored with water being hauled by truck when levels are too high.

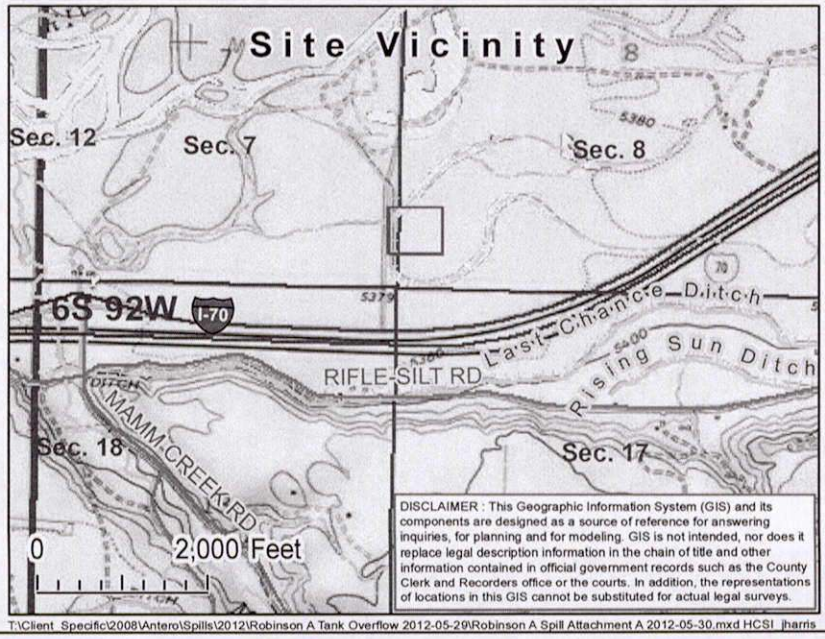
OTHER NOTIFICATIONS

List the parties and agencies notified (County, BLM, EPA, DOT, Local Emergency Planning Coordinator or other).

Date	Agency	Contact	Phone	Response
5/27/2012	COGCC	Linda Spry O'Rourke	970-309-3356	Left message with spill details

Spill/Release Tracking No: 2224964





DISCLAIMER : This Geographic Information System (GIS) and its components are designed as a source of reference for answering inquiries, for planning and for modeling. GIS is not intended, nor does it replace legal description information in the chain of title and other information contained in official government records such as the County Clerk and Recorders office or the courts. In addition, the representations of locations in this GIS cannot be substituted for actual legal surveys.

Attachment A--Spill Location Map

Location: Robinson A Pad

Antero Resources Piceance Corp.

Legend

- Gas Well Head
- **PLSS**
  - Township
  - Section
- Highways
- Public Roads
- **Hydrographic Features**
  - Perennial Stream
  - Intermittent Stream
  - Ditch/Canal

N
W E
S

0 50 100 Feet

HCSI

T:\Client_Specific\2008\Antero\Spills\2012\Robinson A Tank Overflow 2012-05-29\Robinson A Spill Attachment A 2012-05-30.mxd HCSI jharris

Revision Date: 5/30/2012 5:14:30 PM