



*Colorado Operations
792 Buckhorn Dr.
Rifle, CO 81650*

Location 324342
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Lundgren A Pad

Sampling and Analysis Plan

Colorado Operations

**Piceance Basin
Garfield County, CO**

March 2015

Sampling and Analysis Plan

Introduction

During a site inspection conducted on the Lundgren A by the Colorado Oil and Gas Conservation Commission (COGCC) on December 18, 2012 (Doc #: 668500248), it was noted that the current operator at the time (Antero Resources) was stockpiling waste on location as outlined on page 5 of the inspection report, "Multiple soil & E&P waste stockpiles." The observed stockpiled waste contained a corrective action date of February 22, 2013 to "Remove waste material, or submit a waste management plan."

During a baseline inspection completed on March 13, 2013 as part of a due diligence on behalf of Ursa Operating Company (Ursa), it was observed that no waste stockpiles or landfarms were present. Waste management records retrieval indicate that Antero Resources had disposed of all stockpiled waste on the Lundgren in January of 2013, fulfilling corrective action requirements outlined within the inspection.

In discussions with Ursa and the COGCC, it was conveyed that confirmation sampling is required from the pad surface to determine if all remaining soils satisfy COGCC Table 910-1 thresholds. Ursa has agreed to complete the confirmation sampling in order to close any pending "action required" items remaining from the December 18, 2012 inspection.

Sampling Procedures

Samples will be collected from the areas where stockpiled wastes were outlined in the Google Earth 2011 aerial photograph provided by the COGCC (See Figure 1).

Confirmation sample(s) will be collected and submitted for lab analysis for verification from each area outlined in Figure 1 to confirm compliance with Rule 910 and Table 910-1. Below is the sampling proposed the areas solid waste was once present.

- Landfarm Area – The area along the southern side of the pad where the suspected landfarm was staged will be split into two sections (east and west). A five (5) point composite sample will be collected within each section at a depth of 2-6 inches below ground surface. Each composite will be submitted separately for COGCC Table 910-1.
- Stockpiled Soils – The three (3) areas on the north side of the pad outlined in Figure 1 as "Stockpiles" will be sampled at depth of 2-6 inches below ground surface and composited. The one composite will be analyzed for COGCC Table 910-1.

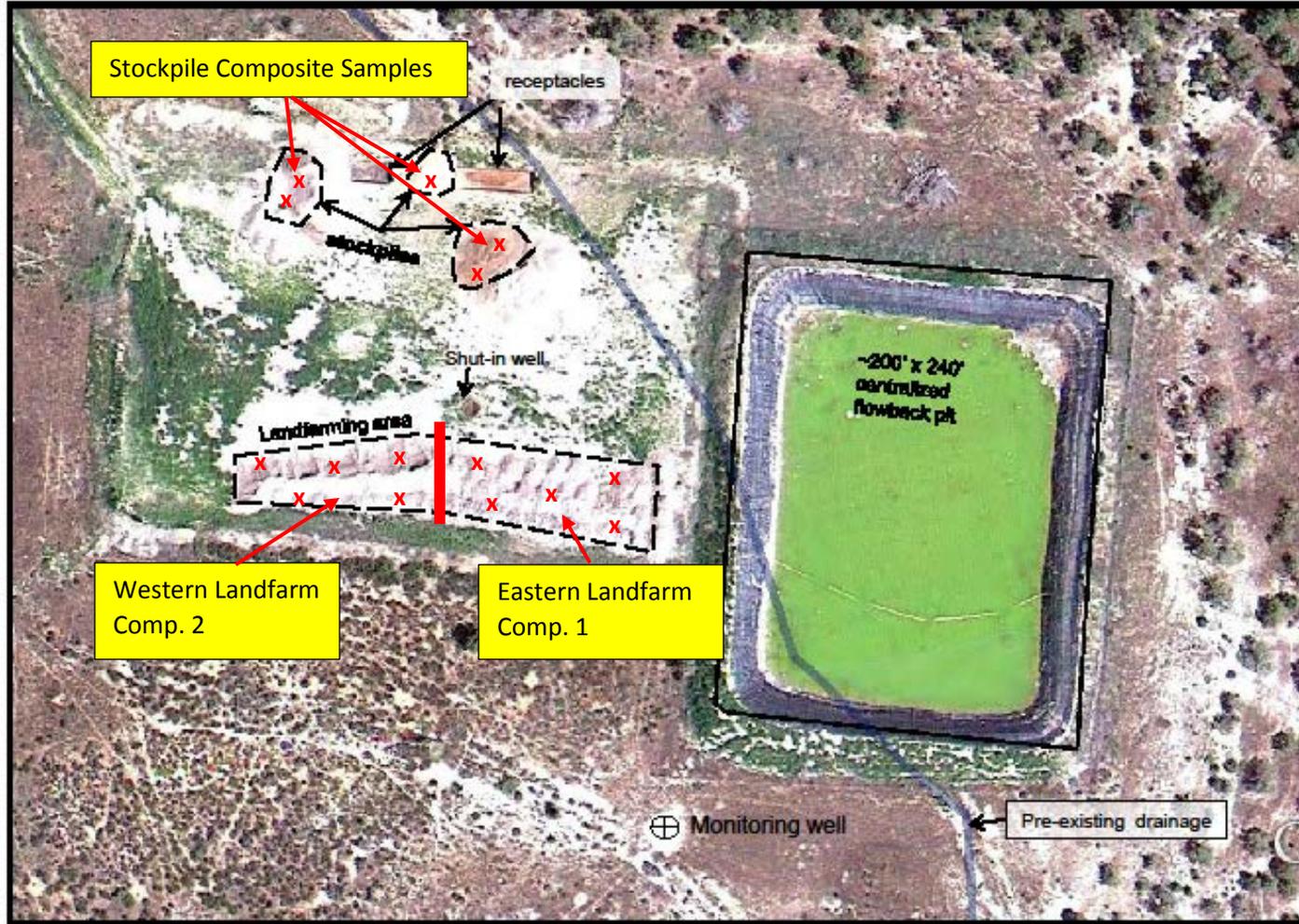
Background samples have been collected from an up-gradient undisturbed location from previous activities and will be used for inorganic and arsenic comparison.

Analytical Confirmation

Confirmation samples will be submitted to ALS Group Laboratory in Holland, Michigan for constituents outlined in COGCC Table 910-1 (see Appendix A).

Figure 1: Lundgren Pad Sampling Layout

Antero Lundgren A-1 Location ID# 324342 (Lundgren Frac/Flowback Pit, #149019)



Google Earth: 2011 Aerial Image

Facility Name: Lundgren A
 Location ID# 324342
 Doc. #: 668500248

Name of Operator: Ursa Operating Company LLC
 Latitude: 39.569809 Longitude: -107.740696
 Location: NWSE, Sec 32, T5S, R92W, 6th PM

COGCC Operator # 10447
 County: Garfield

Appendix A: Confirmatory Analyte List for Potential Contaminants of Concern in Soil:

<u>Analyte Class</u>	<u>Analysis</u>	<u>Method</u>	<u>COGCC Table 910-1 Standard</u>	<u>Holding Time</u>	<u>Container</u>	
Organics	TVPH (GRO)	SW8015 mod	500 mg/kg	14 days	4 oz. wide mouth jar	
	TEPH (DRO)					
	Benzene	SW8021	0.17 mg/kg	14 days	4 oz. wide mouth jar	
	Toluene		85 mg/kg			
	Ethylbenzene		100 mg/kg			
	Xylenes (total)		175 mg/kg			
	Acenaphthene	SW8270	1,000 mg/kg	14 days	4 oz. wide mouth jar	
	Anthracene		0.22 mg/kg			
	Benzo (A) anthracene					
	Benzo (B) flouranthene					
	Benzo (K) fluoranthene		0.022 mg/kg			
	Benzo (A) pyrene					
	Chrysene					22 mg/kg
	Dibenzo (A,H) anthracene					0.022 mg/kg
	Fluoranthene					1,000 mg/kg
	Fluorne					0.22 mg/kg
	Indeno (1,2,3,C,D) pyrene					
	Naphthalene	23 mg/kg				
	Pyrene	1,000 mg/kg				
Inorganics	Electrical Conductivity	USDA Hdbk	<4 mmhos/cm or 2x background	28 days	4 oz. wide mouth jar	
	Sodium Adsorption Rate	USDA Hdbk 60 Method 20B or 3A	<12	180 days	1 gal. ziplock bag	
	pH	SW9045	6-9	< 24 hrs.	2 oz. wide mouth jar	

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Table 1 Cont'd - Sample collection, handling and analysis summary

<u>Analyte Class</u>	<u>Analysis</u>	<u>Method</u>	<u>COGCC Table 910-1 Standard</u>	<u>Holding Time</u>	<u>Container</u>
Total Metals*	Arsenic	SW 6010, 6020, 7470	0.39 mg/kg	28 days for Hg & 180 days for remaining	4 oz. wide mouth jar
	Barium		15,000 mg/kg		
	Cadmium		70 mg/kg		
	Chromium (III)		120,000 mg/kg		
	Chromium (IV)		23 mg/kg		
	Copper		3,100 mg/kg		
	Lead (inorganic)		400 mg/kg		
	Mercury		23 mg/kg		
	Nickel (soluble salts)		1,600 mg/kg		
	Selenium		390 mg/kg		
	Silver		390 mg/kg		
	Chloride		15,000 mg/kg		

General note: Preservation standards for organics and inorganics in soil are < 4°C as per EAL protocol. Of the above sample methods and procedures, none require a preservative to preserve sample integrity.