

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  
8/11/2011

1. OGCC Operator Number: 10079	4. Contact Name: Cole Kilstrom	Complete the Attachment Checklist
2. Name of Operator: Antero Resources Corporation	Phone: (303) 357-6709	
3. Address: 1625 17th St # 300	Fax: (303) 357-7315	OP OGCC
City: Denver State: CO Zip: 80202-5986		
5. API Number 05- N/A	OGCC Facility ID Number N/A	Survey Plat
6. Well/Facility Name: N/A	7. Well/Facility Number N/A	Directional Survey
8. Location (Qtr/Qtr, Sec, Twp, Rng, Meridian):		Surface Equip Diagram
9. County: Garfield County	10. Field Name: MAMM Creek 52500	Technical Info Page
11. Federal, Indian or State Lease Number:		Other

## General Notice

<input type="checkbox"/> CHANGE OF LOCATION: Attach New Survey Plat (a change of surface qtr/qtr is substantive and requires a new permit)	
Change of Surface Footage from Exterior Section Lines:	<input type="checkbox"/> FNL/FSL <input type="checkbox"/> FEL/FWL
Change of Surface Footage to Exterior Section Lines:	
Change of Bottomhole Footage from Exterior Section Lines:	
Change of Bottomhole Footage to Exterior Section Lines:	
Bottomhole location Qtr/Qtr, Sec, Twp, Rng, Mer	
Latitude	Distance to nearest property line
Longitude	Distance to nearest bldg, public rd, utility or RR
Ground Elevation	Distance to nearest lease line
	Is location in a High Density Area (rule 603b)? Yes/No
	Distance to nearest well same formation
	Surface owner consultation date:
GPS DATA:	
Date of Measurement:	PDOP Reading
	Instrument Operator's Name
<input type="checkbox"/> CHANGE SPACING UNIT	<input type="checkbox"/> Remove from surface bond
Formation Formation Code Spacing order number Unit Acreage Unit configuration	Signed surface use agreement attached
<input type="checkbox"/> CHANGE OF OPERATOR (prior to drilling):	<input type="checkbox"/> CHANGE WELL NAME
Effective Date:	From:
Plugging Bond: <input type="checkbox"/> Blanket <input type="checkbox"/> Individual	To:
	Effective Date:
<input type="checkbox"/> ABANDONED LOCATION:	<input type="checkbox"/> NOTICE OF CONTINUED SHUT IN STATUS
Was location ever built? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date well shut in or temporarily abandoned:
Is site ready for inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No	Has Production Equipment been removed from site? <input type="checkbox"/> Yes <input type="checkbox"/> No
Date Ready for Inspection:	MIT required if shut in longer than two years. Date of last MIT
<input type="checkbox"/> SPUD DATE:	<input type="checkbox"/> REQUEST FOR CONFIDENTIAL STATUS (6 mos from date casing set)
<input type="checkbox"/> 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	
<input type="checkbox"/> RECLAMATION: Attach technical page describing final reclamation procedures per Rule 1004.	
Final reclamation will commence on approximately	<input type="checkbox"/> Final reclamation is completed and site is ready for inspection.

## Technical Engineering/Environmental Notice

<input type="checkbox"/> Notice of Intent	<input type="checkbox"/> Report of Work Done
Approximate Start Date:	Date Work Completed:
Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)	
<input type="checkbox"/> Intent to Recomplete (submit form 2)	<input type="checkbox"/> Request to Vent or Flare
<input type="checkbox"/> Change Drilling Plans	<input type="checkbox"/> Repair Well
<input type="checkbox"/> Gross Interval Changed?	<input type="checkbox"/> Rule 502 variance requested
<input type="checkbox"/> Casing/Cementing Program Change	<input checked="" type="checkbox"/> Other: Waste Management Plan for Spills and Releases
	<input type="checkbox"/> E&P Waste Disposal
	<input type="checkbox"/> Beneficial Reuse of E&P Waste
	<input type="checkbox"/> Status Update/Change of Remediation Plans

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

Signed:

Date: 8/11/11 Email: ckilstrom@anteroresources.com

Print Name: Cole Kilstrom

Title: Environmental Specialist

COGCC Approved:

Title:

Date:

CONDITIONS OF APPROVAL, IF ANY:

Location Ids  
311621  
311696  
335541  
335540  
335539  
335546

TECHNICAL INFORMATION PAGE



FOR OGCC USE ONLY

1. OGCC Operator Number: 10079 API Number: N/A
2. Name of Operator: Antero Resources Corporation OGCC Facility ID #: N/A
3. Well/Facility Name: N/A Well/Facility Number: N/A
4. Location (QtrQtr, Sec, Twp, Rng, Meridian): N/A

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 amendment "WASTE MANAGEMENT PLAN: Surface Hole Drill Cuttings."

## **ANTERO RESOURCES**

### **WASTE MANAGEMENT PLAN: Surface Hole Drill Cuttings**

This amendment to Antero's January, 2011 Waste Management Plan ("WMP") addresses the procedures for generating, handling, and the ultimate beneficial use or disposal of surface hole drill cuttings. As described below, surface hole drill cuttings are generated by the rig used to drill to surface hole casing depths. This amendment to the WMP only applies to drill cuttings material generated by the spudder rig where no drilling fluids or additives are used. In cases where a full size rig is used and/or where chemicals or fluids beyond fresh clean water are used will require separate approval as detailed in the January 2011 WMP.

Consistent with COGCC Rule 907.a(3), the sections below present a description of the type and general origin of the waste; the proposed waste characterization procedures; interim waste management and/or treatment procedures; product quality assurance; and recommended final disposal and beneficial use options.

#### **2.1 - A Surface Hole Drill Cuttings**

##### **2.1 – A(i) Description**

Antero recently changed its drilling practices, and is now using a smaller rig (truck mounted "Spudder Rig") to spud each well and drill to the surface casing depth. The Spudder Rig drills to about 1,000 feet depth and the surface casing is set before the Big Rig (currently Frontier 12) gets onsite, and drills to total depth.

When Antero utilizes a Spudder Rig, the hole is drilled using air drilling technology and sometimes fresh water is pumped into the bore for dust control. Fresh water is obtained directly from local sources including Grand River Marketing and Loesh Cran Ditch Company. Drilling additives are not used by the Spudder Rig. Dirt and rock debris from the bore is returned to the surface during drilling. This is the waste stream characterized as surface hole drill cuttings and is addressed in this WMP amendment.

Because surface hole drill cuttings originate from the well bore, the waste stream is regulated as an E&P exempt waste, as discussed in the WMP. However, surface hole cuttings are considerably different than Antero's typical drill cuttings generated from the Big Rig, and a separate waste profile is generated for both the Spudder Rig drilling cuttings and the Big Rig (Frontier 12) drill cuttings. For wells drilled by the Big Rig, drilling additives are mixed into the drill mud to lubricate the well bore. With respect to the Spudder Rig, no additives or drilling muds are used during the surface hole drilling.

In summary, the waste profile and basic constituents of the Spudder Rig cuttings are limited to impacted soils excavated from the wellbore. Antero is seeking approval to dispose of these surface hole drill cuttings in accordance with the beneficial use process authorized under COGCC rules.

### **2.1 – A(ii) Origin/Source**

For the remainder of calendar year 2011, Antero anticipates drilling 26 wells to surface casing depth with the Spudder Rig. Although this list is subject to change, the anticipated wells to be drilled in 2011 and their respective pads are outlined below in no particular order.

#### **North Bank B Pad: Location ID # 311621**

1. NorthBank B7: API - 05-045-12417

#### **Dixon B Pad: Location ID # 311696**

1. Dixon Fed CA B13: API - 05-045-20424
2. Dixon Fed CA B7: API - 05-045-13869
3. Dixon Federal B11: API - 05-045-20428
4. Dixon Federal B12: API - 05-045-20432
5. Dixon Federal B16: API - 05-045-20425
6. Dixon Federal B15: API - 05-045-20429
7. Dixon Fed CA B2: API - 05-045-13818
8. Dixon Fed CA B1: API - 05-045-13819
9. Dixon Federal B14: API - 05-045-20427
10. Dixon Federal B6: API - 05-045-14372

#### **O'Toole A Pad: Location ID # 335541**

1. O'Toole A6: API - 05-045-18327
2. O'Toole A5: API - 05-045-18329

#### **Burckle A Pad: Location ID 335540**

1. Burckle A5: API - 05-045-16989
2. Burckle A8: API - 05-045-13959
3. Burckle A6: API - 05-045-16990
4. Burckle A4: API - 05-045-13704

#### **McPherson A Pad: Location ID # 335539**

1. McPherson A1: API - 05-045-14474
2. McPherson A10: API- to be determined
3. McPherson A6: API - 05-045-17067
4. McPherson A8: API - 05-045-14475

#### **Robinson C Pad: Location ID # 335546**

1. Robinson C10: API - 05-045-17109
2. Robinson C12: API - 05-045-17104
3. Robinson C6: API - 05-045-17106
4. Robinson C2: API - 05-045-17108
5. Robinson C3: API - 05-045-17105

### **2.1 – A(iii) Surface Hole Drill Cuttings: Interim Waste Management/Treatment Procedures**

The interim waste management/treatment procedures for drill cuttings generated by the Spudder Rig will be as follows:

- Store on-site within pad perimeter berms, minimizing stormwater runoff contact.

- Transfer to the Burckle A pad area (Antero property located in Section 16, T6S, R92W) within perimeter berms, minimizing storm water contact. This area will be used for interim management of surface hole cuttings through onsite land application, until a final beneficial use is selected. Upon commencement, storm water inspections will be implemented.
- Investigate and select final beneficial use option as discussed below.
- Document the quantity of surface hole cuttings stored at the land farming location. Additional record keeping requirements are specified below.

### **2.1 – A(iv) Waste Characterization/Quality Assurance**

Despite the benign nature of these materials, for precautionary purposes, a representative sample of the surface hole cuttings will be tested for RCRA metals as well as Mercury. Composite samples will be collected every 250 cubic yards and at a minimum of one composite sample per surface hole wellbore as recommended by the COGCC and this is more frequent than the current landfill requirements. These parameters will be compared to background soil levels and COGCC Table 910-1 standards to demonstrate that the cuttings to be used for beneficial use create no significant adverse environmental impact.

Samples of background soils will be taken from the land immediately adjacent to the pads from which the cuttings are originating. One background sample will be collected per specific pad and tested for RCRA metals and Mercury parameters for comparison to the surface hole cuttings. Additional background samples may be collected and analyzed for mercury because mercury background levels are typically high in the area. In addition, Antero will conduct periodic visual inspections of cuttings to ensure uniformity of materials and suitability for the final beneficial use selected. Certain components of the cuttings (e.g. organic soils) may be separated for specific uses.

**Table 2.1 – A Surface Hole Cuttings Waste Management Analyses**

<b>Parameters</b>	<b>Method</b>
RCRA Metals (Ag, As, Ba, Cd, Cr, Hg, Pb, Se)	RCRA Series 700— analyzed as total metals
Mercury	EPA 245.1

### **2.1 – A(v) Beneficial Use/Disposal/Treatment**

While stored for interim land application at the Burckle Site, final beneficial use options will be investigated and chosen to best suit local conditions and needs. Surface hole drill cuttings will then be used in the following manner based on site-specific circumstances. In each case, specific records will be maintained for every final use, as detailed below.

- **Castle Springs Interim Reclamation Project:**
  - Antero is in the process of creating an Interim Reclamation Plan for four pad sites in the Castle Springs area. Interim reclamation at these sites will involve reducing the pad size (area) at the end of the summer. Reducing the pad sites will involve re-grading the area to its original conditions and re-seeding the area to with the goal being the establishment of an 80% vegetation cover.
  - After re-grading activities, top soil and fill material will need to be placed on the surface to promote vegetation growth. Antero proposes to use surface hole

cuttings as fill in this particular area. Some of the dirt from the surface hole cuttings is dark (organic) soil. This soil can potentially be used as top soil for interim reclamation.

- The pads to undergo interim reclamation are the Castle Springs B Pad, V Pad, Pad and eventually the D Pad.
- Beneficial use/spreading of cuttings on other pad sites. Possible uses are:
  1. Topsoil for interim reclamation.
  2. Fill material on pad surface for future pads or compressor stations.
  3. Clay materials to reinforce pad perimeter berms.
  4. Pad repairs: perimeter berms, ruts and holes on the pad surface.
  5. Record Keeping requirements specified in section 2.1 –A(vi) will be applicable.
- Transport to a third party land farm or compost facility.
- Donate to a local farmer or landowner as fill or topsoil after land farming at the Burckle area, and in accordance with COGCC rules, and pending site specific approval and additional sampling and analysis.
  1. The transfer of surface hole cuttings to a local farmer will be evaluated on a site-by-site basis. To memorialize each transfer, Antero will request approval, for each proposed beneficial use, with the submittal of a Sundry Form 4. The Sundry Form 4 will include a written and signed agreement with the surface owner and will also document the origin, quantity and the location of beneficial use for the surface hole cuttings. Additional sampling and analysis will be considered at the request of the landowner/farmer.
  2. Record keeping requirements specified below will be applicable.

#### **2.1 – A(vi) Recordkeeping and Other Requirements**

Antero maintains a database 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 all surface hole drill cuttings generated.

- Facility location/pad name of generation;
- The type of waste will be documented as surface hole cuttings;
- Quantity of surface hole cuttings;
- Location of transport for final beneficial use or disposal, including contact information for property owner and name and GPS coordinate location of beneficial use site.
- Date of transport;
- Identify transporter;
- Obtain transporter signatures for records.

This information will be recorded on Antero's Non-Hazardous Waste Manifest and will be entered into Antero's Waste Management Database. Antero will submit a biannual waste management report to the COGCC via Sundry Form 4 for surface hole cuttings approved for beneficial use. The biannual report will be in the form of a table summary that will include the above mentioned record keeping items in this section (2.1 – A(vi)).