

west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

November 19, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-9502202, issued to ANTERO RESOURCES CORPORATION, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin

Chief

Operator's Well No: WALL UNIT 1H

Farm Name: SECKMAN, LLOYD C.

API Well Number: 47-9502202

Permit Type: Horizontal 6A Well

Date Issued: 11/19/2014

API Number:

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. <u>Failure to adhere to the specified permit</u> conditions may result in enforcement action.

CONDITIONS

- 1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
- 2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
- 3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
- 4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
- 5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
- 6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
- 7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
- 8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
- 9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS WELL WORK PERMIT APPLICATION

1) Well Operator	Antero Res	ources Corporation	494488557	095-Tyler	Centerville	Shirley 7.5'
			Operator ID	County	District	Quadrangle
2) Operator's We	II Number: <u>V</u>	Vall Unit 1H	Well Pad	Name: Existin	ng Pierpoin	t Pad
3) Farm Name/St	ırface Owner	Seckman, Lloyd	<u>C.</u>			
4) Elevation, curr	ent ground:	~1210' Ele	evatioi ww-	6B		
	a) Gas Other	Oil	Unde	rground Storag	e	111111111111111111111111111111111111111
()		nallow	Deep			
6) Existing Pad:	Yes or No Y	es				
, ,		(s), Depth(s), Antici anticipated Thickness-	*		Pressure(s):	
8) Proposed Tota	l Vertical Dep	oth: 6900 TVD				
9) Formation at T	otal Vertical	Depth: Marcellus S	Shale WW-	6B		
10) Proposed Tot	al Measured	Depth: 14,300' MD	(
11) Proposed Ho	rizontal Leg I	Length: 6692'				
12) Approximate	Fresh Water	Strata Depths:	287', 392'			
13) Method to De 14) Approximate		_	Veigel Unit 1H (API ♯	47-095-02126)	on same pac	1.
15) Approximate	Coal Seam D	Depths: 896'				
16) Approximate	Depth to Pos	sible Void (coal mi	ne, karst, other):	None anticipated		
		on contain coal seam to an active mine?	ns Vac —	No	\Box	
(a) If Yes, prov	ide Mine Info	: Name:	WW-	6B		
		Depth:				
		Seam:				
		Owner:				
				Office of	CEIVED Oil and	Gas

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WV Department of 11/21/2014 Environmental Protection

WW-6B (9/13)

18)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/48#	450'	450'	CTS, 625 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2,450'	2,450'	CTS, 998 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	14,300'	14,300'	3,540 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#	I I	7,100	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tall - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

MDG 9-3-14

PACKERS

Kind:	N/A		
Sizes:	N/A		
Depths Set:	N/A		

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WW-6B (9/13)

19) Describe proposed well work, including the drilling and plugging back of any pilot ho	le:
Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.	
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure	and max rate:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for probe comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."	
21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 22.29 e	xisting acres
22) Area to be disturbed for well pad only, less access road (acres): 3.18 existing acres	
23) Describe centralizer placement for each casing string:	
Conductor: no centralizers Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up to surface.	the hole
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to superior Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.	urface.
24) Describe all cement additives associated with each cement type:	
Conductor: no additives, Class A cement. Surface: Class A cement with 2-3% calcium chloride and 1/4 lb of flake	
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat	1
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-52 Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACGB-47 + 0.05% ACGB-47 + 0.05% ACSA-51 + 0.2% ACGB-47 + 0.05% ACGB-47	· · · · · · · · · · · · · · · · · · ·
25) Proposed borehole conditioning procedures:	
Conductor: blowhole clean with air, run casing, 10 bbls fresh water. Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, cir fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.	culate pipe capacity + 40 bbls
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.	casing, circulate 40 bbls brine
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to bas	
barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.	ffice of Oil and Gas
*Note: Attach additional sheets as needed.	SEP 0 8 2014

WV Department of Environmental Protection WW-9 (9/13)

API Number	47 -	095	*
Ope	rator's	Well No.	Wall Unit 1H

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICE OF OIL AND GAS

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

FLUIDS/ CUTTINGS DISPOSAL & RECLAIV	IATION PLAN
Operator Name Antero Resources Corporation	OP Code 494488557
Watershed (HUC 10) Tributary of Middle Island Creek Quadrangle	Shirley 7.5'
Elevation 1201' County Tyler	District Centerville
Do you anticipate using more than 5,000 bbls of water to complete the proposed w Will a pit be used? Yes No	ell work? Yes Vo No
If so, please describe anticipated pit waste:No pit will be used at this site (Drilling and Flowbi	ack Fluids will be stored in tanks. Cuttings will be tunked and hauled off site.)
Will a synthetic liner be used in the pit? Yes No If s	o, what ml.? N/A
Proposed Disposal Method For Treated Pit Wastes:	
Land Application Underground Injection (UIC Permit Number Reuse (at API Number Future permitted well locations when appl Off Site Disposal (Supply form WW-9 for disposal locations (Explain)	icable. APi# will be provided on Form WR-34
Will closed loop system be used? If so, describe: Yes	
Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater	oil based, etc. Dust/StiffFeam, Production - Water Based Mud
	9-3-14
Additives to be used in drilling medium? Please See Attachment	
Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Stored in	tanks, removed offsite and taken to landfill.
-If left in pit and plan to solidify what medium will be used? (cement, lim	
-Landfill or offsite name/permit number? Meadowfill Landfill (Permit #SWF-10	· ·
I certify that I understand and agree to the terms and conditions of the GI on August I, 2005, by the Office of Oil and Gas of the West Virginia Department of provisions of the permit are enforceable by law. Violations of any term or condition or regulation can lead to enforcement action. I certify under penalty of law that I have personally examined and am application form and all attachments thereto and that, based on my inquiry of obtaining the information, I believe that the information is true, accurate, and penalties for submitting false information, including the possibility of fine or impri	of Environmental Protection. I understand that the tion of the general permit and/or other applicable familiar with the information submitted on this of those individuals immediately responsible for complete. I am aware that there are significant
Company Official Signature	NOTARY PUBLIC
Company Official (Typed Name) Evan Foster	STATE OF COLORADO NOTARY ID 20144028112
Company Official Title Environmental Representative	THE COMMISSION EXPINES THE VICE DATE IN
	Office of Oil and Gas
Subscribed and sworn before me this 22 day of August	, 20 <u>14</u> SEP 0 8 2014
My C. Jaking	Notary Public WV Department of
My commission expires July 1807, 2014	Environmental Protection

roposed Revegetation Treatmen	t: Acres Disturbed 22.29	(existing) Prevegetation pH	
	Tons/acre or to correct to pH		
	aw or Wood Fiber (will be used v	where needed)	
Fertilizer amount 500	11-	os/acre	
Mulch 2-3	Tons/		
Construction (3.18) + Auxillary Pad Constru		Construction (4.06) + Access Road Construction (2.38) + A	Additional Clearing (10.80) = 22.29 E
	See	d Mixtures	
Тетро	orary	Permanen	t
Seed Type	lbs/acre	Seed Type	lbs/acre
Tall Fescue	45	Tall Fescue	45
Perennial Rye Grass	20	Perennial Rye Grass	20
or type of grass seed reques	sted by surface owner	*or type of grass seed requeste	d by surface owner
attach: Prawing(s) of road, location, pit rovided)	and proposed area for land ap	plication (unless engineered plans includ	ing this info have been
Prawing(s) of road, location, pit rovided) Thotocopied section of involved Plan Approved by:	7.5' topographic sheet.		
Prawing(s) of road, location, pit rovided) Thotocopied section of involved Plan Approved by:	7.5' topographic sheet.		
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Prawing(s) of road, location, pit rovided) Photocopied section of involved Plan Approved by: Michael Comments: Present WV DEP requirements readed.	7.5' topographic sheet. A mulch a lations, Mainta!	ny distorbed ar	eas per

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Form WW-9 Additives Attachment

SURFACE INTERVAL

- 1. Fresh Water
- 2. Soap -Foamer AC
- 3. Air

INTERMEDIATE INTERVAL

STIFF FOAM RECIPE:

- 1) 1 ppb Soda Ash / Sodium Carbonate-Alkalinity Control Agent
- 2) 1 ppb Conqor 404 (11.76 ppg) / Corrosion Inhibitor
- 3) 4 ppb KLA-Gard (9.17 ppg) / Amine Acid Complex-Shale Stabilizer
- 4) 1ppb Mil Pac R / Sodium Carboxymethylcellulose-Filtration Control Agent
- 5) 12 ppb KCL / Potassium Chloride-inorganic Salt
- 6) Fresh Water 80 bbls
- 7) Air

PRODUCTION INTERVAL

1. Alpha 1655

Salt Inhibitor

2. Mil-Carb

Calcium Carbonate

3. Cottonseed Hulls

Cellulose-Cottonseed Pellets – LCM

4. Mil-Seal

Vegetable, Cotton & Cellulose-Based Fiber Blend – LCM

5. Clay-Trol

Amine Acid Complex – Shale Stabilizer

6. Xan-Plex

Viscosifier For Water Based Muds

7. Mil-Pac (All Grades)

Sodium Carboxymethylcellulose – Filtration Control Agent

8. New Drill

Anionic Polyacrylamide Copolymer Emulsion – Shale Stabilizer

9. Caustic Soda

Sodium Hydroxide – Alkalinity Control

10. Mil-Lime

Calcium Hydroxide - Lime

11. LD-9

Polyether Polyol – Drilling Fluid Defoamer

12. Mil Mica

Hydro-Biotite Mica – LCM

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Drilling Fluild Solvent - Aliphatic Hydrocarbon

14. Ligco

Highly Oxidized Leonardite - Filteration Control Agent

15. Super Sweep

Polypropylene - Hole Cleaning Agent

16. Sulfatrol K

Drilling Fluid Additive - Sulfonated Asphalt Residuum

17. Sodium Chloride, Anhydrous

Inorganic Salt

18. D-D

Drilling Detergent - Surfactant

19. Terra-Rate

Organic Surfactant Blend

20. W.O. Defoam

Alcohol-Based Defoamer

21. Perma-Lose HT

Fluid Loss Reducer For Water-Based Muds

22. Xan-Plex D

Polysaccharide Polymer - Drilling Fluid Viscosifier

23. Walnut Shells

Ground Cellulosic Material - Ground Walnut Shells - LCM

24. Mil-Graphite

Natural Graphite - LCM

25. Mil Bar

Barite - Weighting Agent

26. X-Cide 102

Biocide

27. Soda Ash

Sodium Carbonate – Alkalinity Control Agent

28. Clay Trol

Amine Acid complex – Shale Stabilizer

29. Sulfatrol

Sulfonated Asphalt - Shale Control Additive

30. Xanvis

Viscosifier For Water-Based Muds

31. Milstarch

Starch - Fluid Loss Reducer For Water Based Muds

32. Mil-Lube

Drilling Fluid Lubricant

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911 ADDRESS: 314 JUG RUN ROAD ALMA, WEST VIRGINIA 26320

Well Site Safety Plan Antero Resources

Well Name: Klondike Unit 3H, Klondike Unit 2H, Klondike

Unit 1H, Weigle Unit 1H, Ingot Unit 1H, Ingot

Unit 2H, Wall Unit 1H, Wall Unit 2H

Pad Location: PIERPOINT PAD

Tyler County/ Centerville District

GPS Coordinates: Lat 39°27′07.57"/Long 80°51′31.66" (NAD83)

Driving Directions:

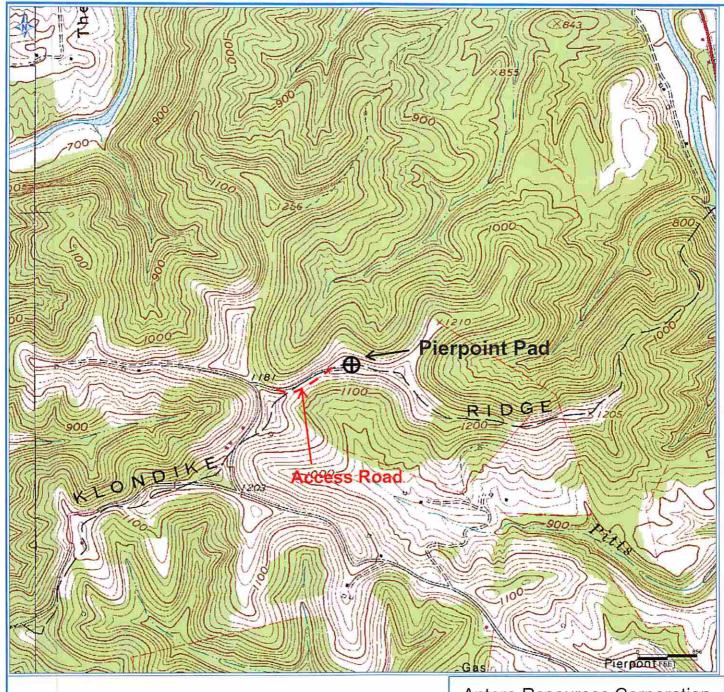
From Sistersville, at the intersection of Diamond Street and Chelsea Street, head southwest on Chelsea Street and follow for about 1 mile. Turn left onto WV-18 South/Tyler Highway and follow for about 20 miles (passing through Middlebourne). Turn right onto County Road 46/Klondike Ridge and follow for about 2 miles. Turn right onto County Road 46/1/Jug Run and go approximately 0.3 miles. Access road will be on the right.

From Pennsboro, at the intersection of Main Street and Collins Avenue, head north on Main Street and take the first right onto Wells Avenue. Road turns left and becomes 1st Street. Follow for approximately 0.1 miles. Take a slight right onto WV-74 North/Mountain Drive and follow for approximately 10.8 miles. Continue onto WV-18 North and follow for approximately 4.5 miles. Turn left onto County Road EIVED 46/Klondike Ridge and follow for approximately 2miles. Turn right onto County Road 46/1/Jug Run and Gas go approximately 0.3 miles. Access road will be on the right.

EMERGENCY (24 HOUR) CONTACT 1-800-878-1373

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Antero Resources Corporation

APPALACHIAN BASIN

Wall Unit 1H Tyler County

REMARKS

QUADRANGLE: Shirley 7.5' WATERSHED:TRIB. OF MIDDLE ISLAND CR DISTRICT: Centerville

Date: 7/11/2013 1/21/2014

