



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

PERMIT MODIFICATION APPROVAL

May 02, 2014

ANTERO RESOURCES APPALACHIAN CORPORATION
1625 17TH STREET, SUITE 300
DENVER, CO 80202

Re: Permit Modification Approval for API Number 3305709 , Well #: HILDRED UNIT 2H
Lateral Extended

Oil and Gas Operator:

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

Gene Smith
Regulatory/Compliance Manager
Office of Oil and Gas



Antero Resources
1625 17th Street
Denver, Colorado 80202
Office 303.357.7310
Fax 303.357.7315

December 18, 2013

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Ms. Laura Cooper
601 57th Street
Charleston, WV 25304

Ms. Laura Cooper:

Antero Resources Corporation (Antero) would like to submit the following permit modification for an approved well on the existing Corder East Pad. We are requesting to extend the horizontal lateral length which will change the bottom hole location of the **Hildred Unit 2H (API# 47-033-05709)**.

Attached you will find the following documents:

- REVISED Form WW-6B, which shows the revised MD and Production Casing/Cement program
- REVISED Form WW-6A1, which shows the leases we will be drilling into
- REVISED Mylar Plat, which shows the new bottom hole location

If you have any questions please feel free to contact me at (303) 357-7323.

Thank you in advance for your consideration.

Sincerely,

Ashlie Mihalcin
Permit Representative
Antero Resources Corporation

RECEIVED
Office of Oil & Gas

DEC 30 2013

WV Department of
Environmental Protection

Enclosures

05/02/2014

WW-6B
(9/13)

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

1) Well Operator: Antero Resources Corporation 494488557 033- Harrison Union Big Isaac
Operator ID County District Quadrangle

2) Operator's Well Number: Hildred Unit 2H Well Pad Name: Existing Corder East Pad

3) Farm Name/Surface Owner: Corder, Gerald W. and Louella M. et al Public Road Access: CR 30/1

4) Elevation, current ground: 1405' Elevation, proposed post-construction: 1405'

5) Well Type (a) Gas Oil Underground Storage

Other

(b) If Gas Shallow Deep

Horizontal

6) Existing Pad: Yes or No Yes

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Marcellus Shale: 7,700' TVD, Anticipated Thickness-50 feet, Associated Pressure- 3,200#

8) Proposed Total Vertical Depth: 7,700' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 16,800' MD

11) Proposed Horizontal Leg Length: 8795'

12) Approximate Fresh Water Strata Depths: 360'

13) Method to Determine Fresh Water Depths: Opie Unit 1H (API#47-033-05677) on same pad

14) Approximate Saltwater Depths: 797', 900'

15) Approximate Coal Seam Depths: 595', 905'

16) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

Del
5-2-14

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#	415'	415'	CTS, 577 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2420'	2420'	CTS, 985 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	16,800'	16,800'	4,245 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7200'	
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						

PACKERS

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

David Arlan
5-2-14

WW-6B
(9/13)

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

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 production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in 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): 11.02 Existing Acres

22) Area to be disturbed for well pad only, less access road (acres): ~4.08 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 the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

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

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

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-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

25) Proposed borehole conditioning procedures:

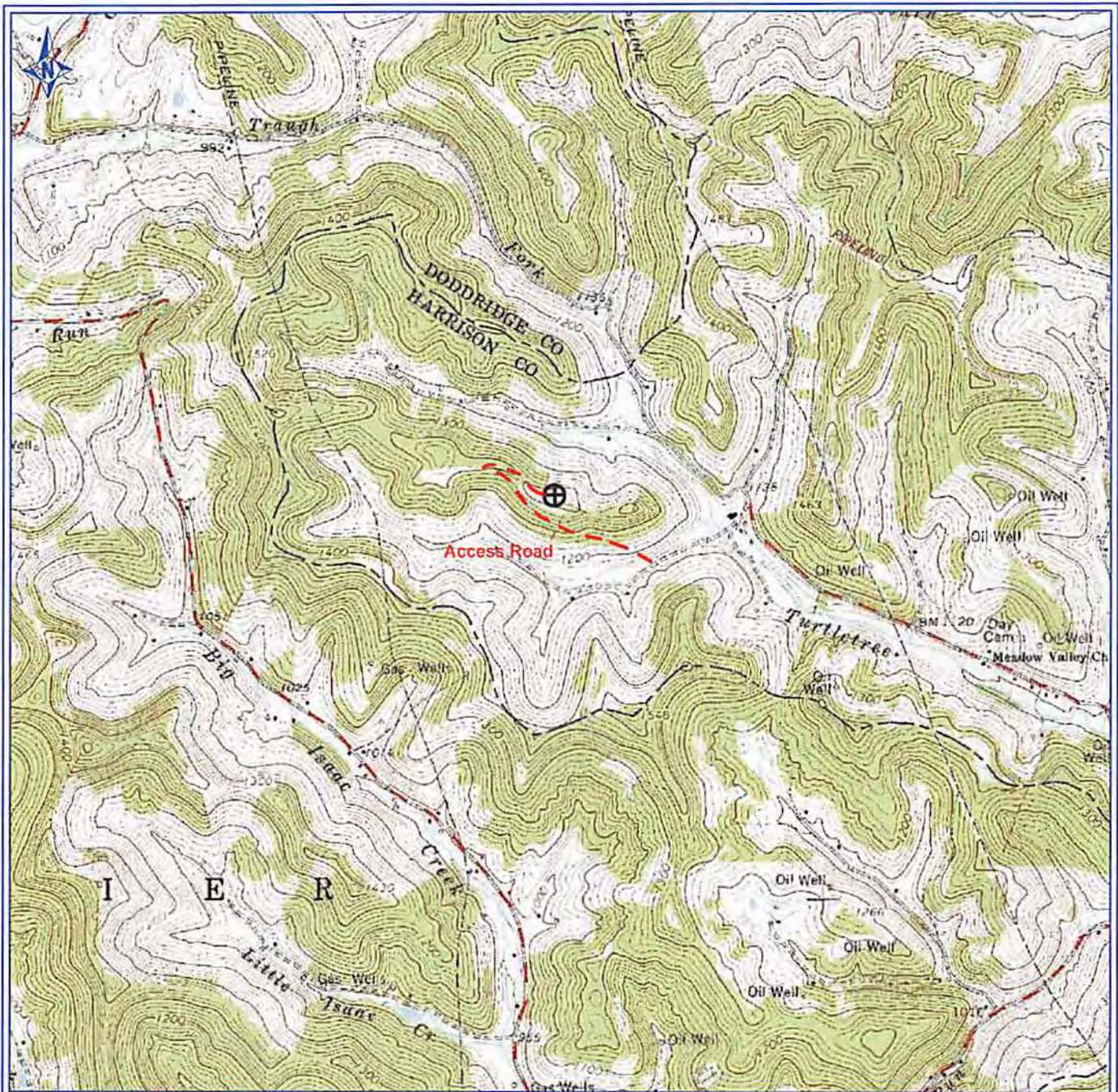
Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.



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33-05709

Antero Resources Corporation

Appalachian Basin

Hildred Unit 2H

Harrison County



REMARKS
 QUADRANGLE: BIG ISSAC
 WATERSHED: TURTLE TREE FORK OF
 TENMILE CREEK
 DISTRICT: UNION

June 6, 2012

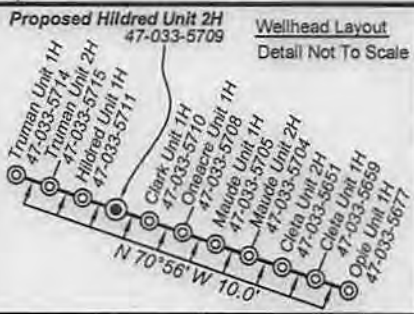
05/02/2014

10,478' to Bottom Hole

Antero Resources
Well No. Hildred Unit 2H
Antero Resources Corporation

Tax Map 8 Parcels

Par	Owner	DB/Pg	Acres
1 13	Lucille Devericks Billy J. Devericks	WB42/159	23.0
2 3	Clarence & Mary Mutschelknaus	267/726	22.86
3 10.5	Butterfly Evolution Trust	250/468	0.41
4 10	Butterfly Evolution Trust	250/468	18.05
5 10.4	Butterfly Evolution Trust	250/468	0.76
6 10.1	Barbara Ann Templeton	206/575	12.67
7 9	Jonell L. Carver	265/418	21.7
8 10.6	Butterfly Evolution Trust	250/468	10.66
9 10.3	Butterfly Evolution Trust	250/468	27.8
10 4	Butterfly Evolution Trust	263/40	135.89



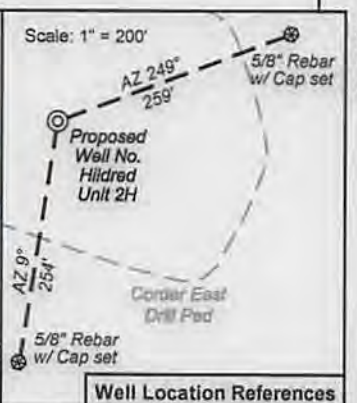
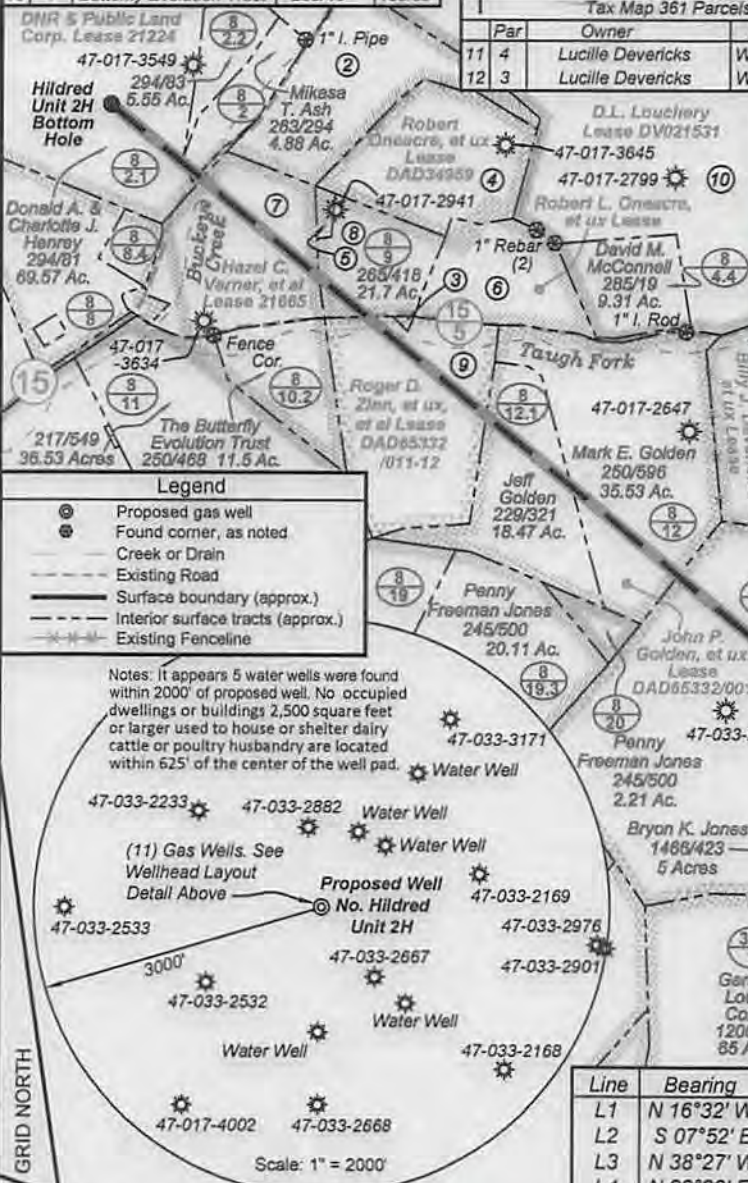
3,537' to Top Hole
LATITUDE 39 - 15 - 00

Notes:
West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.
Well No. Hildred Unit 2H Top Hole coordinates are
N: 264,852.58 Latitude: 39°13'20.53"
E: 1,701,469.40 Longitude: 80°33'13.46"
Bottom Hole coordinates are
N: 271,013.07 Latitude: 39°14'20.60"
E: 1,694,528.24 Longitude: 80°34'42.59"
UTM Zone 17, NAD 1983
Top Hole Coordinates: Bottom Hole Coordinates:
N: 4,341,558.461m N: 4,343,399.985m
E: 538,536.975m E: 536,391.022m
Plat orientation and corner and well references are based upon the grid north meridian.
Well location references are based upon the magnetic meridian.

LONGITUDE 80 - 32 - 30
10,023' to Top Hole
3,862' to Bottom Hole

Tax Map 361 Parcels

Par	Owner	DB/Pg	Acres
11 4	Lucille Devericks	WB167/23	9.84
12 3	Lucille Devericks	WB167/23	9.70



I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the rules issued and prescribed by the Department of Environmental Protection.

Kenneth J. Plum
Kenneth J. Plum, P.S. 2216



FILE NO: 232-30-G-12
DRAWING NO: 232-12 Hildred 2H Well
SCALE: 1" = 1200'
MINIMUM DEGREE OF ACCURACY: Submeter
PROVEN SOURCE OF ELEVATION: WVDOT, Bridgeport, WV

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

DATE: October 10, 2013
OPERATOR'S WELL NO. Hildred Unit 2H
API WELL NO: MOD
47 - 033 - 05709 H6A
STATE COUNTY PERMIT

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL
(IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
LOCATION: ELEVATION: 1405' WATERSHED: Turtletree Fork of Tenmile Creek QUADRANGLE: Big Isaac
DISTRICT: Union COUNTY: Harrison
SURFACE OWNER: Gerald & Louella Corder ROYALTY OWNER: Maude D. Day, et al; Orle Mitchell; Howard D. Nicholson, et al
PROPOSED WORK: DRILL CONVERT DRILL DEEPER FRACTURE OR STIMULATE PLUG OFF OLD FORMATION
 PERFORATE NEW FORMATION OTHER PHYSICAL CHANGE IN WELL (SPECIFY) Modification - BHL
 PLUG AND ABANDON CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: TVD 7,700' MD 16,800'

WELL OPERATOR: Antero Resources Corporation DESIGNATED AGENT: Dianna Stamper - CT Corporation System
ADDRESS: 1625 17th Street ADDRESS: 5400 D Big Tyler Road
Denver, CO 80202 Charleston, WV 25313