



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

February 12, 2014

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

Re: Permit Modification Approval for API Number 1706311 , Well #: NICKERS UNIT 2H
Changed orientation of lateral

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,

A handwritten signature in blue ink, appearing to read 'Ashley' followed by a flourish, with the word 'for' written below it.

Gene Smith
Regulatory/Compliance Manager
Office of Oil and Gas



December 11, 2013

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

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 modifications for three approved wells on the Cline Pad. We are requesting to move the horizontal lateral which will change the bottom hole location of the Nickers Unit 2H (API# 47-017-06311), Farrow Unit 2H (API# 47-017-06362) and Farrow Unit 3H (API# 47-017-06366).

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

Enclosures



02/14/2014

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 017-Doddridge New Milton New Milton 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Nickers Unit 2H Well Pad Name: Cline Pad

3) Farm Name/Surface Owner: Johnnie Cline et al Public Road Access: CR 18

4) Elevation, current ground: ~1105 Elevation, proposed post-construction: 1096'

5) Well Type (a) Gas Oil Underground Storage

Other _____

(b) If Gas Shallow Deep _____

Horizontal _____

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Marcellus Shale: 7200' TVD, Anticipated Thickness- 60 Feet, Associated Pressure- 3250#

8) Proposed Total Vertical Depth: 7200' TVD

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 15,900' MD

11) Proposed Horizontal Leg Length: 8,495'

12) Approximate Fresh Water Strata Depths: 203', 214'

13) Method to Determine Fresh Water Depths: Offset well records. Depths have been adjusted according to surface elevations.

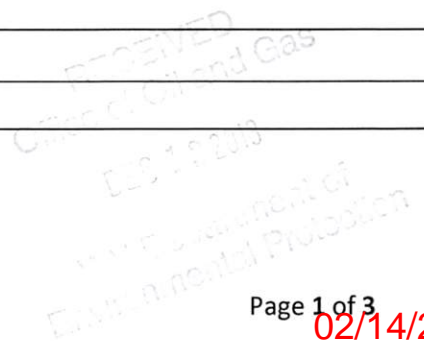
14) Approximate Saltwater Depths: 612', 1595'

15) Approximate Coal Seam Depths: 258', 809'

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: _____



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#	305'	305'	CTS, 424 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2480'	2480'	CTS, 1010 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	15,900'	15,900'	3974 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

AL for DN 2/12/14

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 & Tail - 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			

RECEIVED
Office of Oil and Gas
DEC 18 2013
Department of
Environmental Protection

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): 11.97 acres

22) Area to be disturbed for well pad only, less access road (acres): 5.55 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.

WW-6A1

Operator's Well Number Nickers Unit 2H

INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Grantor, lessor, etc.	Grantee, lessee, etc.	Royalty	Book/Page
✓ <u>Frank Hinter et al Lease</u>			
Frank Hinter, et al	Bill D. Haught	1/8	0068/0306
Bill D. Haught, et ux	South Triangle Oil Company	Assignment	0068/0314
South Triangle Oil Company	Floyd A. Gearhart	Assignment	0081/0203
Randy F. Gearhart heirs of Floyd A. Gearhart, et ux	Antero Resources Appalachian Corporation	Assignment	0271/0216
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
✓ <u>Grover Johnson et al Lease</u>			
Grover Johnson, et al	George Buff Jr., et al	1/8	0070/0466
George Buff Jr., et al	Helen K. Buff, et al	Will	WB 0014/0548
Helen Buff, et al	Ila Powell	Assignment	Recital in 0162/0695-A
Ila Powell	P & M Oil Company	Assignment	0162/0695-A
P & M Oil Company	R & K Oil and Gas, Inc.	Assignment	0190/0371
P & M Oil Company, et al	R & K Oil and Gas, Inc.	Corrective Assignment	0233/0053
R & K Oil and Gas, Inc., et al	Bluestone Energy Partners	Assignment	0234/0080
Bluestone Energy Partners	Antero Resources Bluestone, LLC a wholly owned Subsidiary of Antero Resources Appalachian Corporation	Merger	0288/0001
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
✓ <u>S.A. Hurst et ux Lease</u>			
S.A. Hurst, et ux	Big Injun Oil & Gas Co., Inc.	1/8	0069/0190
Big Injun Oil & Gas Co., Inc.	B.K. Slaughter, et ux	Assignment	0069/0257
B.K. Slaughter, et ux	Devonian Gas & Oil Company	Assignment	0072/0206
Devonian Gas & Oil Company, et al	Quaker State Oil Refining Corporation	Indenture	0094/0486
Quaker State Oil Refining Corporation, et al	Belden & Blake Corporation	Assignment, Conveyance and Bill of Sale	0175/0466
Belden & Blake Corporation	Peake Energy, Inc.	Assignment, Conveyance and Bill of Sale	0181/0114
Peake Energy, Inc.	North Coast Energy Eastern, Inc.	Name Change	0250/0368
North Coast Energy Eastern, Inc.	Exco-North Coast Energy Eastern, Inc.	Affidavit of name change	0277/0068
Exco-North Coast Energy Eastern, Inc.	EXCO Resources (WV), Inc.	Name Change	Exhibit 2
EXCO Resources (WV), Inc.	EXCO Resources (WV), LLC	Name Change	0285/0083
EXCO Resources (WV), LLC	EXCO Production Company (WV), LLC	Name Change	Exhibit 3
EXCO Production Company (WV), LLC	Antero Resources Appalachian Corporation	Assignment	0285/0084
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
✓ <u>Ruby Gene Dicks Lease</u>			
Ruby Gene Dicks	Antero Resources Appalachian Corporation	1/8 +	0301/0021
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1

*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

CONTINUED ON NEXT PAGE

02/14/2014

WW-6A1
(5/13)

Operator's Well No. Nickers Unit 2H

**INFORMATION SUPPLIED UNDER WEST VIRGINIA CODE
Chapter 22, Article 6A, Section 5(a)(5)
IN LIEU OF FILING LEASE(S) AND OTHER CONTINUING CONTRACT(S)**

Under the oath required to make the verification on page 1 of this Notice and Application, I depose and say that I am the person who signed the Notice and Application for the Applicant, and that –

- (1) the tract of land is the same tract described in this Application, partly or wholly depicted in the accompanying plat, and described in the Construction and Reclamation Plan;
- (2) the parties and recordation data (if recorded) for lease(s) or other continuing contract(s) by which the Applicant claims the right to extract, produce or market the oil or gas are as follows:

Lease Name or Number	Grantor, Lessor, etc.	Grantee, Lessee, etc.	Royalty	Book/Page
<u>Stokes Hurst, Jr et ux Lease</u>				
Stokes Hurst, Jr et ux	Big Injun Oil & Gas Co., Inc.	Big Injun Oil & Gas Co., Inc.	1/8	0069/0187
B.K. Slaughter, et ux	Devonian Gas & Oil Company	B.K. Slaughter, et ux	Assignment	0069/0257
Devonian Gas & Oil Company, et al	Quaker State Oil Refining Corporation	Devonian Gas & Oil Company	Assignment	0072/0206
Quaker State Oil Refining Corporation, et al	Belden & Blake Corporation	Quaker State Oil Refining Corporation	Indenture	0094/0486
Belden & Blake Corporation	Peake Energy, Inc.	Belden & Blake Corporation	Assignment, Conveyance and Bill of Sale	0175/0466
Peake Energy, Inc.	North Coast Energy Eastern, Inc.	Peake Energy, Inc.	Assignment, Conveyance and Bill of Sale	0181/0114
North Coast Energy Eastern, Inc.	Exco-North Coast Energy Eastern, Inc.	North Coast Energy Eastern, Inc.	Name Change	0250/0368
Exco-North Coast Energy Eastern, Inc.	EXCO Resources (WV), Inc.	Exco-North Coast Energy Eastern, Inc.	Affidavit of name change	0277/0068
EXCO Resources (WV), Inc.	EXCO Resources (WV), LLC	EXCO Resources (WV), Inc.	Name Change	Exhibit 2
EXCO Resources (WV), LLC	Antero Resources Appalachian Corporation	EXCO Resources (WV), LLC	Name Change	0285/0083
EXCO Production Company (WV), LLC	Antero Resources Corporation	EXCO Production Company (WV), LLC	Name Change	Exhibit 3
Antero Resources Appalachian Corporation		Antero Resources Corporation	Assignment	0285/0084
			Name Change	Exhibit 1

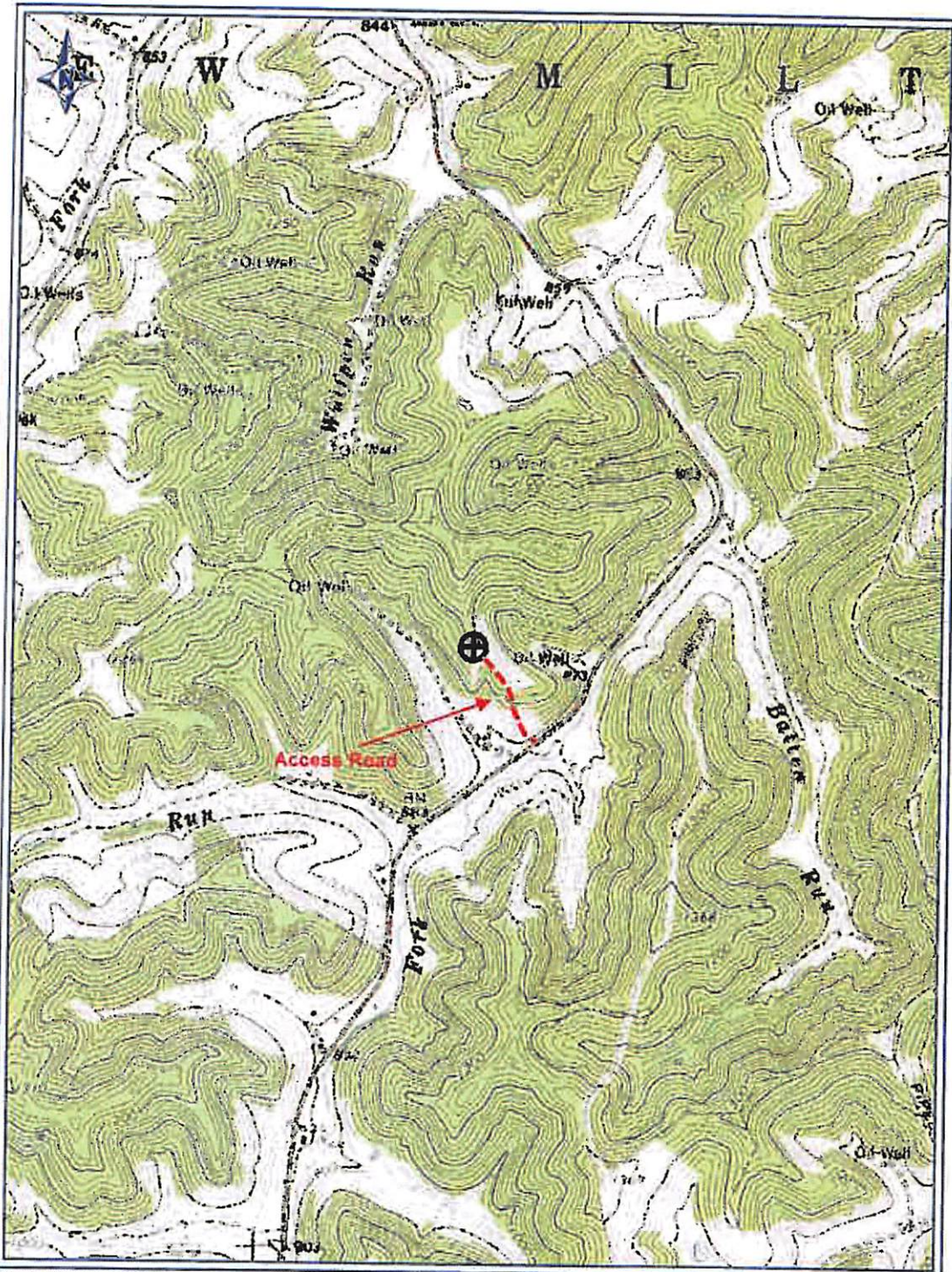
*Partial Assignments to Antero Resources Corporation include 100% rights to extract, produce and market the oil and gas from the Marcellus and any other formations completed with this well.

The permit applicant for the proposed well work addressed in this application hereby acknowledges the possibility of the need for permits and/or approvals from local, state, or federal entities in addition to the DEP, Office of Oil and Gas, including but not limited to the following:

- WV Division of Water and Waste Management
- WV Division of Natural Resources WV Division of Highways
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- County Floodplain Coordinator

The applicant further acknowledges that any Office of Oil and Gas permit in no way overrides, replaces, or nullifies the need for other permits/approvals that may be necessary and further affirms that all needed permits/approvals should be acquired from the appropriate authority before the affected activity is initiated.

Well Operator: Antero Resources Corporation
 By: Kevin Kilstrom
 Its: Vice President of Production



PETRA 8/3/2013 2:37:31 PM

*DCW
8-21-2013*

Antero Resources Corp

APPALACHIAN BASIN

Nickers Unit 2H

Doddridge County

REMARKS

QUADRANGLE: NEW MILTON
WATERSHED: TOM'S FORK
DISTRICT: NEW MILTON

By: ECM



02/14/2014

LATITUDE 39°12'30"

9,364'

1,369' TO BOTTOM HOLE
2H BOTTOM HOLE

LATITUDE 39°12'30"

291' TO BOTTOM HOLE
LONGITUDE 80°42'30"

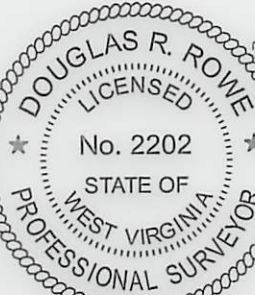
8,261'

LONGITUDE 80°40'00"

Antero Resources Corporation
Well No. Nickers Unit 2H

LINE	BEARING	DISTANCE
L1	S 02°32' E	1116.9'
L2	S 05°07' E	1077.4'
L3	S 10°50' E	1354.7'
L4	S 17°49' E	1303.4'
L5	S 42°00' E	1281.9'
L6	S 64°54' E	969.2'

ROGER CARPENTER ET AL
D.B. 239 PG. 322
T.M. 11 PAR. 06
100 AC. ±



JOSHUA T. BLOOM ET AL
D.B. 280 PG. 488
T.M. 11 PAR. 08
33.76 AC. ±

DEBORAH LYNN WYCKOFF
W.B. 43 PG. 01
T.M. 12 PAR. 12.2
17.16 AC. ±

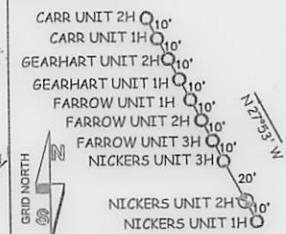
NOTES:
WELL 2H TOP HOLE INFORMATION:
N: 252,000ft E: 1,659,941ft
LAT: 39°11'08.36" LON: 80°41'58.93"
BOTTOM HOLE INFORMATION:
N: 260,019ft E: 1,656,233ft
LAT: 39°12'27.12" LON: 80°42'47.39"
WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE GEOXT SUBMETER MAPPING GRADE GPS UNIT. PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 2H TOP HOLE INFORMATION:
N: 4,337,432m E: 525,950m
BOTTOM HOLE INFORMATION:
N: 4,339,856m E: 524,780m

NOTE
NO OCCUPIED DWELLINGS OR BUILDINGS TWO THOUSAND FIVE HUNDRED (2,500) SQUARE FEET OR LARGER USED TO HOUSE OR SHELTER DAIRY CATTLE OR PASTURE HUSBANDRY ARE LOCATED WITHIN SIX HUNDRED TWENTY-FIVE (625) FEET OF THE CENTER OF THE WELL PAD.

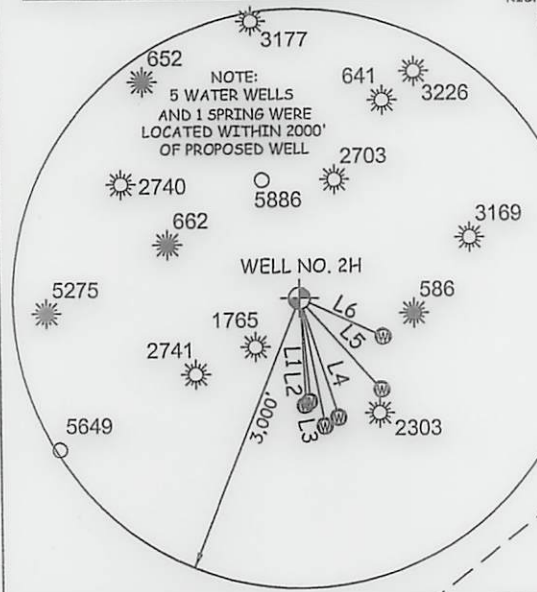
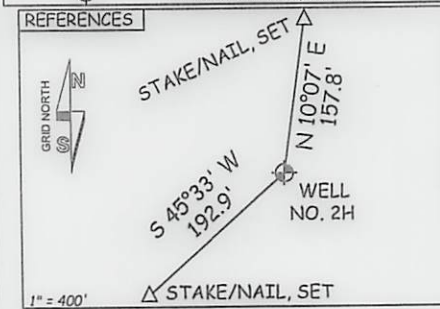
PAD LAYOUT

NOT TO SCALE



LEGEND

- Surface Owner Boundary Lines +/-
- Interior Surface Tracts +/-
- Existing Fence
- Found monument, as noted



STOKES HURST JR. ET UX LEASE
DEBORAH LYNN WYCKOFF
W.B. 43 PG. 01
T.M. 12 PAR. 12
124.89 AC. ±

RUBY GENE DICKS LEASE
ROY K. NICHOLSON
D.B. 229 PG. 379
T.M. 12 PAR. 29
84.36 AC. ±

UDELLA MAE PROUDFOOT BARNETT LEASE
NELSON & WHITE ET UX
D.B. 178 PG. 87
T.M. 12 PAR. 31
24.25 AC. ±

S.A. HURST ET UX LEASE

2H TOP HOLE
JAMES W. MCKINNEY ET UX
D.B. 198 PG. 753
T.M. 14 PAR. 09.1
1 AC. ±

MICHAEL D. FLUHARTY ET AL
D.B. 270 PG. 364
T.M. 15 PAR. 01
153.25 AC. ±

RICHARD G. ROBINSON
D.B. 251 PG. 148
T.M. 14 PAR. 09
158.54 AC. ±

CARL HINTER HEIRS ET AL
W.B. 29 PG. 444
T.M. 15 PAR. 12
231.49 AC. ±

REBAR FOUND

GROVER JOHNSON ET AL LEASE

JACEK FRONC
D.B. 277 PG. 129
T.M. 15 PAR. 02.1
74.747 AC. ±

JOAN R. FARROW ET AL
W.B. 42 PG. 214
T.M. 15 PAR. 02
67.09 AC. ±

STONE FOUND

EDWARD R. KELLEY ET AL
D.B. 184 PG. 205
T.M. 15 PAR. 13.1
35.20 AC. ±

LANDING POINT
N:251917
E:1658787

ROBERT G. CONRAD ET AL
D.B. 232 PG. 317
T.M. 15 PAR. 13.2
91.91 AC. ±

JOHNNIE CLINE ET AL
D.B. 193 PG. 443
T.M. 15 PAR. 13.3
70.088 AC. ±

JOB # 13-029WA

DRAWING # NICKERS2HR3

SCALE 1" = 1000'

MINIMUM DEGREE OF ACCURACY SUBMETER

PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS

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 PERSCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415

DOUGLAS R. ROWE P.S. 2202

DATE 09/12/13

OPERATOR'S WELL# NICKERS UNIT #2H

API WELL # 47-017-06311-16A

STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X
LOCATION: ELEVATION 1,096' WATERSHED TOMS FORK

QUADRANGLE NEW MILTON 7.5' DISTRICT NEW MILTON COUNTY DODDRIDGE
SURFACE OWNER JOHNNIE CLINE ET AL ACREAGE 70.088 ACRES +/- 02/14/2014

OIL & GAS ROYALTY OWNER FRANK HINTER ET AL; GROVER JOHNSON ET AL; LEASE ACREAGE 329.73 ACRES±; 153.25 ACRES±; S.A. HURST ET UX; RUBY GENE DICKS; STOKES HURST JR. ET UX 156 ACRES±; 117.197 ACRES±; 211 ACRES±

PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL
(SPECIFY) Modification - BHL PLUG & ABANDON CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS ESTIMATED DEPTH 7,200' TVD 15,900' MD

WELL OPERATOR ANTERO RESOURCES CORP. DESIGNATED AGENT DIANNA STAMPER
ADDRESS 1625 17TH STREET ADDRESS 5400 D BIG TYLER ROAD
FORM WW-6 DENVER, CO 80202 CHARLESTON, WV 25313

COUNTY NAME PERMIT