



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Wednesday, October 24, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET

DENVER, CO 80202

Re: Permit Modification Approval for HAYES UNIT 1H
47-085-10365-00-00

Modified Lateral Length 6986'

ANTERO RESOURCES CORPORATION

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.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: HAYES UNIT 1H
Farm Name: DANIEL M. HAYMOND IV
U.S. WELL NUMBER: 47-085-10365-00-00
Horizontal 6A New Drill
Date Modification Issued: October 24,2018

Promoting a healthy environment.

WW-6B
(04/15)

API NO. 47-085 - 10365
OPERATOR WELL NO. Hayes Unit 1H
Well Pad Name: Lettie Pad

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

1) Well Operator: Antero Resources Corporation 494507062 085 - Ritchie Clay Pennsboro 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Hayes Unit 1H Well Pad Name: Lettie Pad

3) Farm Name/Surface Owner: Daniel M. Haymond IV, et al Public Road Access: Stull Hill Rd.

4) Elevation, current ground: 970' Elevation, proposed post-construction: _____

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 Expected Pressure(s):
Marcellus Shale: 6800' TVD, Anticipated Thickness- 75 feet, Associated Pressure- 2800#

8) Proposed Total Vertical Depth: 6800' TVD

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19700' MD

11) Proposed Horizontal Leg Length: 6986'

12) Approximate Fresh Water Strata Depths: 408'

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

14) Approximate Saltwater Depths: 1760'

15) Approximate Coal Seam Depths: 622'

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: _____

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Office of Oil and Gas

JUL 23 2018

WW-6B
(04/15)

Permit Modification - API# 47-085-10365 **MOD**
 API NO. 47- 085 - 10365
 OPERATOR WELL NO. Hayes Unit 1H
 Well Pad Name: Lettie Pad

18)

CASING AND TUBING PROGRAM

TYPE	<u>Size (in)</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling (ft)</u>	<u>INTERVALS: Left in Well (ft)</u>	<u>CEMENT: Fill-up (Cu. Ft.)/CTS</u>
Conductor	20"	New	H-40	94#	80'	80'	CTS, 77 Cu. Ft.
Fresh Water	13-3/8"	New	J-55	54.5#	460' *see #19	460' *see #19	CTS, 639 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2500'	2500'	CTS, 1018 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	23#	19700'	19700'	5009 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7100'	
Liners							

TYPE	<u>Size (in)</u>	<u>Wellbore Diameter (in)</u>	<u>Wall Thickness (in)</u>	<u>Burst Pressure (psi)</u>	<u>Anticipated Max. Internal Pressure (psi)</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	20"	24"	0.438"	1530	50	Class A	~1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730	1000	Class A	~1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	1500	Class A	~1.18
Intermediate							
Production	5-1/2"	8-3/4" & 8-1/2"	0.451"	14,530	2500	Lead-H/POZ & Tail - H	H/POZ~1.44 & H~1.8
Tubing	2-3/8"	4.778"	0.19"	11,200			
Liners							

PACKERS

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

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WV Department of
Environmental Protection

WW-6B
(10/14)

Permit Modification - API# 47-085-10365 **MUD**
API NO. 47- 085 - 10365
OPERATOR WELL NO. Hayes Unit 1H
Well Pad Name: Lettie Pad

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.
*Antero will be air drilling the fresh water string which makes it difficult to determine when fresh water is encountered. Therefore, we have built in a buffer for the casing setting depth which helps to ensure that all fresh water zones are covered.

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."

Anticipated Max Pressure - 9300 lbs
Anticipated Max Rate - 80 bpm

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 14.68 Acres

22) Area to be disturbed for well pad only, less access road (acres): 6.68 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 and 1/4 lb of flake
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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Page 3 of 3

Operator's Well Number

Hayes Unit 1H

Permit Modification - API# 47-085-10365

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>Irene Nutter Haymond Trust Lease</u>			
Irene Nutter Haymond Trust	DC Petroleum, Inc.	1/8+	0257/0085
DC Petroleum, Inc.	Antero Resources Appalachian Corporation	Assignment	0257/0763
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Perkins Oil and Gas Co. Lease</u>			
Perkins Oil and Gas Co	Antero Resources Corporation	1/8+	0311/0923
<u>Candice Winzeler Nigolian Lease</u>			
Candice Winzeler Nigolian	Antero Resources Corporation	1/8+	0268/0281
<u>Norman Fleming Lease</u>			
Norman Fleming	DC Petroleum Inc	1/8	0254/1053
DC Petroleum Inc	Antero Resources Appalachian Corporation	Assignment	0259/0862
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>L.S. Taggart et al Lease</u>			
L.S. Taggart et al	Alton Skinner	1/8	0131/0508
Alton Skinner	Chase Petroleum Inc	Assignment	0142/0171
Chase Petroleum, Inc	Antero Resources Appalachian Corporation	Partial Assignment	0254/0133
Antero Resources Appalachian Corporation	Antero Resources Corporation	Name Change	Exhibit 1
<u>Carl W. Ridgway Et Ux Lease</u>			
Carl W. Ridgway Et Ux	Excelco Inc.	1/8	0197/0006
Excelco Inc.	Appalachian Energy Development	Assignment	0197/0412
Appalachian Energy Development	Triad Energy Corporation of WV	Assignment	0229/0108
Triad Energy Corporation of WV	Triad Energy Corporation	Name Change	0007/0624
Triad Energy Corporation	Triad Hunter LLC	Assignment	0250/0196
Triad Hunter LLC	Antero Resources Corporation	Assignment	0270/0270

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*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.

WW-6A1
(5/13)

Operator's Well No. Hayes Unit 1H

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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>Michael A. Toothman et ux Lease</u>				
	Michael A. Toothman et ux	KEPCO, Inc	1/8	0174/0068
	KEPCO, Inc	Eastern Pennsylvania Exploration Company	Assignment	0181/0626
	Eastern Pennsylvania Exploration Company	Eastern American Energy Corporation	Name Change	0218/0187
	Eastern American Energy Corporation	Seneca-Upshur Petroleum Inc	Assignment	0243/0839
	Seneca-Upshur Petroleum Inc	Seneca-Upshur Petroleum LLC	Name Change	0311/0863
	Seneca-Upshur Petroleum LLC	Antero Resources Appalachian Corporation	Assignment	0258/0978
	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.

**Acknowledgement of Possible Permitting/Approval
In Addition to the Office of Oil and Gas**

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: Senior VP of Production

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FORM WW-6A1
EXHIBIT 1

4708510365
MCD

FILED

JUN 10 2013



Penney Barker, Manager
Corporations Division
Tel: (304)558-8000
Fax: (304)558-8381
Website: www.wvsof.com
E-mail: business@wvsof.com

Natalie E. Tennant
Secretary of State
1900 Kanawha Blvd E
Bldg 1, Suite 157-K
Charleston, WV 25305

APPLICATION FOR
AMENDED CERTIFICATE
OF AUTHORITY

Office Hours: Monday - Friday
8:30 a.m. - 5:00 p.m. ET

FILE ONE ORIGINAL
(Two if you want a filed
stamped copy returned to you)
FEE: \$25.00

**** In accordance with the provisions of the West Virginia Code, the undersigned corporation hereby ****
applies for an Amended Certificate of Authority and submits the following statement:

- Name under which the corporation was authorized to transact business in WV: Antero Resources Appalachian Corporation
- Date Certificate of Authority was issued in West Virginia: 6/25/2008
- Corporate name has been changed to: Antero Resources Corporation
(Attach one Certified Copy of Name Change as filed in home State of Incorporation.)
- Name the corporation elects to use in WV: Antero Resources Corporation
(due to home state name not being available)
- Other amendments: _____
(attach additional pages if necessary)

6. Name and phone number of contact person. (This is optional, however, if there is a problem with the filing, listing a contact person and phone number may avoid having to return or reject the document.)

Alvyn A. Schopp (303) 367-7310
Contact Name Phone Number

7. Signature Information (See below **Important Legal Notice Regarding Signature**)

Print Name of Signer: Alvyn A. Schopp Title/Capacity: Authorized Person
Signature: [Handwritten Signature] Date: June 10, 2013

Important Legal Notice Regarding Signature Per West Virginia Code §31D-1-129. Penalty for signing false document. Any person who signs a document he or she knows is false in any material respect and knows that the document is to be delivered to the secretary of state for filing is guilty of a misdemeanor and, upon conviction thereof, shall be fined not more than one thousand dollars or confined in the county or regional jail not more than one year, or both.

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Antero Resources Corporation

Hayes Unit 1H - AOR



 WELL SYMBOLS
Gas Well

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UWI (API Num)	Well Name	Well Number	Operator	Hist Oper	TD	Perforated Interval MD (shallowest, deepest)	Perforated Formation(s)	Producible Formation(s) not perf'd
47085072850000	TOOTHMAN MICHAEL A ET UX	WK-240	ALLIANCE PETR CORP	KEPCO INCORPORATED	5,999	4,526 - 5,870	Riley, Benson, Rhinestreet	Warren, Gordon, Baitown
47085077120000	RIDGEWAY CARL W	4	TRIAD HUNTER LLC	APPALACHIAN ENGY DEV	5,640	4660 - 5346	Riley, Benson, Alexander	Warren, Gordon, Baitown

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]

10,025' TO TOP HOLE

LATITUDE 39°22'30"

6,851'

LATITUDE 39°22'30"

LONGITUDE 80°52'30"

3,700'

LONGITUDE 80°52'30"

10,095' TO BOTTOM HOLE

Antero Resources Corporation Well No. Hayes Unit 1H

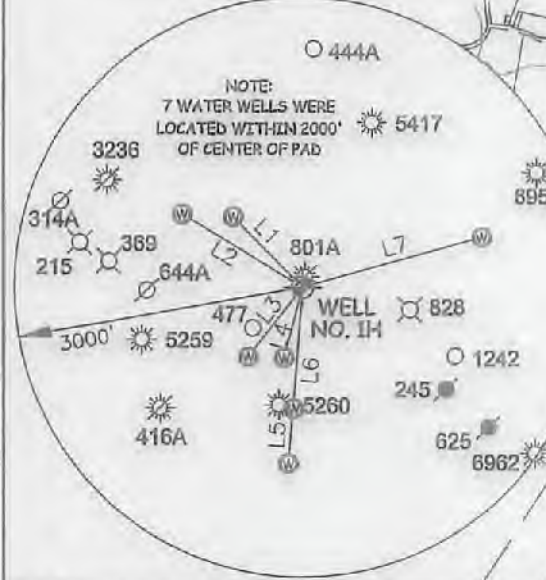
NOTES:
WELL 1H TOP HOLE INFORMATION:
 N: 318,123ft E: 1,601,230ft
 LAT: 39°21'53.43" LON: 80°54'37.65"
BOTTOM HOLE INFORMATION:
 N: 311,680ft E: 1,604,306ft
 LAT: 39°20'50.23" LON: 80°53'57.21"
 WEST VIRGINIA COORDINATE SYSTEM OF 1927 NORTH ZONE. ZONE WAS DERIVED FROM MEASUREMENTS TAKEN WITH TRIMBLE 660XT SUBMETER. 1H TOP MAPPING GRADE GPS UNIT. HOLE PLAT ORIENTATION, CORNER, AND WELL REFERENCE TIE LINES ARE BASED ON GRID NORTH.

(NAD) 83 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
 N: 4,357,277m E: 507,728m
BOTTOM HOLE INFORMATION:
 N: 4,355,330m E: 508,698m



WW NORTH ZONE GRID NORTH

TM-For	Surface Owner	Block/Pg	Acres
04-09	Christin Hayward	346/484	111.48 AC
04-10	Perkins Oil & Gas Inc.	318/683	73.168 AC
04-10.2	Perkins Oil & Gas Inc.	316/760	19.772 AC
04-11.2	Tommy Richmond	308/287	1.56 AC
04-11.8	Henry Hiller	288/1069	8.776 AC
04-11.9	Thomas Smith	331/856	30.639 AC
04-13	Antero Resources Corp.	341/928	1.25 AC
04-13.1	Trusted Mountain Coal, LLC	124/559	1 AC
04-14	Jacob Cox	340/525	3.747 AC
04-15	Christopher Hayward	214/99	1.33 AC
04-27	Perkins Oil & Gas Inc.	304/653	29.589 AC
04-27.1	Perkins Oil & Gas Inc.	308/653	0.79 AC
04-29	Ralph Hayes	265/913	9.91 AC
04-30.1	James Lanter	219/107	6.0 AC
04-32	Gary Bishop	339/45	4.7 AC
04-35	Gary Bishop	339/43	34.286 AC
04-35.1	Leola Jones	309/693	23.4 AC
04-36	William Shirver	185/415	21.4 AC
04-47	Shella Taylor	316/853	6.07 AC
04-47.1	William Shirver	185/415	8.5 AC
04-48	Suton Jones	287/276	42.05 AC
09-01	James Mahoney	277/668	17.83 AC
09-03	Matthew Washington	306/138	39.66 AC
09-04	Zacharia Kelley	312/913	33.50 AC
09-05	Suton Jones	287/276	29.19 AC
09-06	Richard Ridgway	312/65	18 AC
09-07	Suton Jones	287/276	24 AC
09-09	Jeanette Bean Et Al	221/577	51.41 AC
09-12	Jeanette Bean Et Al	174/450	16.33 AC
09-14	Jeanette Bean Et Al	174/450	75.55 AC
09-17	Russell Holmes	293/451	27.43 AC
09-19	Boon Scott	230/625	65 AC
09-20	Walter Smartychin	317/89	70.5 AC
09-21	Ray Robinson	175/817	36 AC
09-21.1	Ray Robinson	175/817	0.55 AC
09-28	Robert Langmeyer	312/911	129.32 AC
09-28.1	Robert Langmeyer	312/911	27.52 AC
09-32	W.V. Christian Youth Camp	178/198	67.75 AC



LINE	BEARING	DIST.
L1	N 44°29' W	1030.7'
L2	N 58°42' W	1467.2'
L3	S 38°14' W	908.2'
L4	S 14°39' W	747.3'
L5	S 04°36' W	1820.0'
L6	S 04°09' W	1253.8'
L7	N 74°14' E	1942.9'

ROYALTY OWNER
A The Irene Nutter Haymond Trust
B Gary R. David Et Ux
C Candice Winzeler Nigolian
D Perkins Oil & Gas
E Charles Eugene Allmon Et Ux
F Wilson Hoskins Et Ux
G Anette P. Deisford
H Norman Fleming
I L. S. Taggart Et Al
J Charlene Cottrell Et Ux
K Carl W. Ridgway Et Ux
L Michael A. Toothman Et Ux
M Charles Eugene Allmon Et Ux
N Gene P. Bond
O Frederick Hardisty
P Orlean Fiddell Rows Et Al

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

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
 N: 14,294,787ft E: 1,665,724ft
POINT OF ENTRY INFORMATION:
 N: 14,294,970ft E: 1,666,544ft
BOTTOM HOLE INFORMATION:
 N: 14,298,398ft E: 1,668,906ft

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



JOB # 17-014WA	LEGEND	REFERENCES
DRAWING # HAYES1HR	--- Surface Owner Boundary Lines +/-	STAKE/MAIL, SET
SCALE 1" = 2000'	- - - Interior Surface Tracts +/-	
MINIMUM DEGREE OF ACCURACY SUBMETER	X Existing Fence	
PROVEN SOURCE OF ELEV. SUBMETER MAPPING GRADE GPS	⊕ Found monument, as noted	STAKE/MAIL, SET 1" = 400'
STATE OF WEST VIRGINIA DEPARTMENT OF ENERGY DIVISION OF OIL AND GAS	<i>Thomas Summers</i>	
	THOMAS SUMMERS P.S. 2109	
	DATE 07/18/18	
	OPERATOR'S WELL# HAYES UNIT 1H	
WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___	47	085
(IF "GAS") PRODUCTION ___ STORAGE ___ DEEP ___ SHALLOW X	STATE	COUNTY
LOCATION: ELEVATION 870' AS BUILT	PERMIT	10365
QUADRANGLE PENNSBORO 7.5'	DISTRICT CLAY	COUNTY RITCHIE
SURFACE OWNER DANIEL M. HAYMOND IV ET AL	ACREAGE 111.48 ACRES +/-	
OIL & GAS ROYALTY OWNER THE IRENE NUTTER HAYMOND TRUST; PERKINS OIL & GAS;	LEASE ACREAGE 375 AC±; 94.0 AC±;	
CANDICE WINZELER NIGOLIAN; NORMAN FLEMING; L. S. TAGGART ET AL;	35.89 AC±; 48.5 AC±; 151 AC±;	
CARL W. RIDGWAY ET UX; MICHAEL A. TOOTHMAN ET UX;	40 AC±; 34 AC±;	
PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER X REDRILL ___ FRACTURE OR STIMULATE X		
PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION X OTHER PHYSICAL CHANGE IN WELL		
(SPECIFY) MOD-BHL	PLUG & ABANDON	CLEAN OUT & REPLUG
TARGET FORMATION MARCELLUS	ESTIMATED DEPTH 6,800' TVD 15,100' MD	
WELL OPERATOR ANTERO RESOURCES CORP.	DESIGNATED AGENT DIANNA STAMPER - CT CORPORATION SYSTEM	
ADDRESS 1615 WYNKOOP ST.	ADDRESS 5400 D BIG TYLER ROAD	
DENVER, CO 80202	CHARLESTON, WV 25313	

COUNTY NAME PERMIT HGA

10,025' TO TOP HOLE

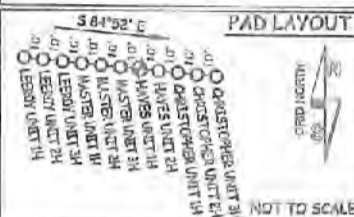
LATITUDE 39°22'30"

6,851' LATITUDE 39°22'30"

Antero Resources Corporation
Well No. Hayes Unit 1H

NOTES:
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04-11.2	Tinney Richmond	305/267	1.66 AC
04-11.5	Henry Hilger	288/1039	0.776 AC
04-11.9	Thomas Smith	551/358	30.639 AC
04-13	Antero Resources Corp.	341/928	1.25 AC
04-13.1	Truitts Mountain Comm. 216	124/569	1 AC
04-14	Jacob Cox	340/325	5.747 AC
04-15	Christopher Haymond	214/59	1.33 AC
04-27	Perkins Oil & Gas Inc.	308/608	29.089 AC
04-27.1	Perkins Oil & Gas Inc.	305/603	0.79 AC
04-29	Ralph Hayes	255/513	9.91 AC
04-30.1	James Lashar	219/107	60 AC
04-32	Gary Bishop	339/45	4.7 AC
04-35	Gary Bishop	339/43	24.253 AC
04-35.1	Leah Jones	309/603	23.424 AC
04-36	William Shriver	105/416	21.4 AC
04-47	Shelia Taylor	316/853	6.07 AC
04-47.1	William Shriver	105/410	8.6 AC
04-48	Susan Jones	287/276	42.05 AC
09-01	James Mahoney	277/668	147.83 AC
09-03	Matthew Washington	305/138	39.66 AC
09-04	Zeehorh Kelley	312/910	33.80 AC
09-05	Susan Jones	287/276	29.19 AC
09-06	Richard Ridgway	312/65	18 AC
09-07	Susan Jones	287/276	24 AC
09-09	Tecnette Bean Et Al	223/277	51.41 AC
09-12	Tecnette Bean Et Al	174/450	16.33 AC
09-14	Tecnette Bean Et Al	174/450	75.56 AC
09-17	Rastler Holmes	298/481	27.43 AC
09-19	Roger Scott	200/625	66 AC
09-20	Walter Swartzly	317/89	70.8 AC
09-21	Roy Robinson	175/817	36 AC
09-21.1	Roy Robinson	175/817	0.56 AC
09-23	Robert Lanemeyer	312/911	129.32 AC
09-23.1	Robert Lanemeyer	312/911	27.52 AC
09-32	W.V. Christian Youth Camp	178/198	87.73 AC

WV NORTH ZONE GRID NORTH

LONGITUDE 80°52'30"

LONGITUDE 80°52'30"

10,095' TO BOTTOM HOLE



LINE	BEARING	DIST.
L1	N 44°29' W	1030.7'
L2	N 58°42' W	1467.2'
L3	S 38°14' W	908.2'
L4	S 14°39' W	747.3'
L5	S 04°35' W	1820.0'
L6	S 04°09' W	1253.8'
L7	N 74°14' E	1942.9'

Royalty Owner
A The Irene Nutter Haymond Trust
B Gary R. Davis Et Ux
C Candice Winzeler Nicolian
D Perkins Oil & Gas
E Charles Eugene Allman Et Ux
F Wilton Hopkins Et Ux
G Anetha P. Brutsford
H Norman Fleming
I L. S. Taggart Et Al
J Charles Catrill Et Vir
K Carl W. Ridgway Et Ux
L Michael A. Toothman Et Ux
M Charles Eugene Allman Et Ux
N Gene P. Bonn
O Frederick Handbury
P Orlan Marshall Davis Et Al

(NAD) 27 (UTM) ZONE 17 COORDS:
WELL 1H TOP HOLE INFORMATION:
N: 14,294,787ft E: 1,655,724ft
POINT OF ENTRY INFORMATION:
N: 14,294,970ft E: 1,666,544ft
BOTTOM HOLE INFORMATION:
N: 14,288,398ft E: 1,668,906ft

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



STATE OF WEST VIRGINIA, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WILLOW LAND SURVEYING PLLC
220 MASONIC AVE. PENNSBORO WEST VIRGINIA 26415



Form containing job details, legend, references, and permit information. Includes fields for JOB # 17-014WA, DRAWING # HAYES1HR, SCALE 1"=2000', and various checkboxes for well type and production. Includes a 'RECEIVED' stamp from the Office of Oil and Gas dated JUL 23 2018.

LETTIE WELL PAD & WATER CONTAINMENT PAD AS-BUILT EROSION CONTROL IMPROVEMENTS

LOCATION COORDINATES:

ACCESS ROAD ENTRANCE
LATITUDE: 39.385306 LONGITUDE: -80.912305 (NAD 83)
N 4357319.87 E 507554.43 (UTM ZONE 17 METERS)

CENTER OF TANK
LATITUDE: 39.385734 LONGITUDE: -80.912124 (NAD 83)
N 4357367.42 E 507559.98 (UTM ZONE 17 METERS)

CENTROID OF PAD
LATITUDE: 39.384936 LONGITUDE: -80.910350 (NAD 83)
N 4357378.99 E 507732.90 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION:

THE ACCESS ROAD(S), WATER CONTAINMENT PAD, AND WELL PAD HAVE BEEN CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

FLOODPLAIN NOTES:

THE SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54085C0125C.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION HAS NOTIFIED MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1419246536. IN ADDITION, MISS UTILITY WAS CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

ENTRANCE PERMIT:

ANTERO RESOURCES CORPORATION HAS OBTAINED AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

ENVIRONMENTAL NOTES:

STREAM AND WETLAND DELINEATIONS WERE PERFORMED IN MAY 2014, JULY 2014, & OCTOBER 2016 BY K.C. HARVEY ENVIRONMENTAL, LLC TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE OCTOBER 31, 2016 DESIGN OVERVIEW MAP WAS PREPARED BY K.C. HARVEY ENVIRONMENTAL, LLC AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP.

GEOTECHNICAL NOTES:

A SUBSURFACE INVESTIGATION OF THE SITE WAS PERFORMED BY PENNSYLVANIA SOIL & ROCK, INC. BETWEEN FEBRUARY 11, 2015 & FEBRUARY 25, 2015. THE REPORT PREPARED BY PENNSYLVANIA SOIL & ROCK, INC. DATED MARCH 27, 2015 REVISED JANUARY 31, 2017, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WERE USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY PENNSYLVANIA SOIL & ROCK, INC. FOR ADDITIONAL INFORMATION, AS NEEDED.

PROJECT CONTACTS:

OPERATOR:

ANTERO RESOURCES CORPORATION
535 WHITE OAKS BLVD.
BRIDGEPORT, WV 26330
PHONE: (304) 842-4100
FAX: (304) 842-4102

ELI WAGONER - ENVIRONMENTAL ENGINEER
OFFICE: (304) 842-4058 CELL: (304) 475-9770

JON MCEVERS - OPERATIONS SUPERINTENDENT
OFFICE: (303) 367-6799 CELL: (303) 808-2423

AARON KUNZLER - CONSTRUCTION SUPERVISOR
CELL: (405) 227-8344

ROBERT B. WIRKS - FIELD ENGINEER
OFFICE: (304) 842-4100 CELL: (304) 627-7405

CHARLES E. COMPTON, III - SURVEYING COORDINATOR
CELL: (304) 719-6449

RICHARD LYLES - LAND AGENT
CELL: (770) 378-8833

ENGINEER/SURVEYOR:

NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (866) 662-4185 CELL: (540) 886-6747

ENVIRONMENTAL:

KC HARVEY ENVIRONMENTAL, LLC
SHANNON THOMPSON - STAFF SCIENTIST
OFFICE: (740) 373-1970 CELL: (970) 398-8250

GEOTECHNICAL:

PENNSYLVANIA SOIL & ROCK, INC.
CHRISTOPHER W. SAMIOS - PROJECT ENGINEER
OFFICE: (412) 372-4000 CELL: (412) 589-0662

RESTRICTIONS NOTES:

1. THERE ARE NO LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD. THERE ARE WETLANDS & PERENNIAL STREAMS ADJACENT TO THE STAGING AREA & WATER CONTAINMENT PAD THAT HAS REMAINED UNDISTURBED.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

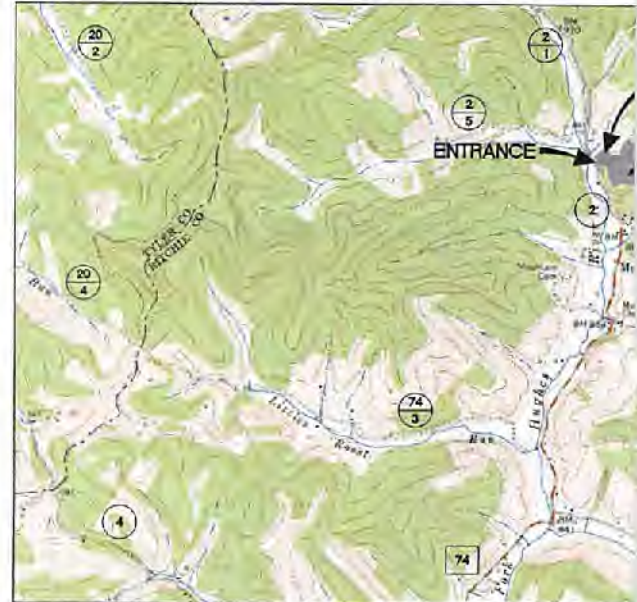
REPRODUCTION NOTE

THESE PLANS WERE CREATED TO BE PLOTTED ON 22"x34" (ANSI B) PAPER. HALF SCALE DRAWINGS ARE ON 11"x17" (ANSI B) PAPER.

THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

CLAY DISTRICT, RITCHIE COUNTY
CABIN RUN-NORTH FORK HUGHES

USGS 7.5 PENNSBORO



2000 0 2
SCALE: 1" = 2000'

WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

AS-BUILT CERTIFICATIONS:

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS CRS 36-8.

WATER CONTAINMENT PAD & SEDIMENT CONTROL PLAN

JUL 23 2018

WV Department of
Environmental Protection

SHEET INDEX:

- 1 - COVER SHEET
- 2 - LEGEND
- 3 - OVERALL PLAN SHEET INDEX
- 4 - ACCESS ROAD, WELL PAD, & WATER CONTAINMENT PAD AS-BUILT PLAN
- 5 - ACCESS ROAD AS-BUILT PROFILE, WELL PAD, WATER CONTAINMENT PAD, & STOCKPILE AS-BUILT SECTIONS

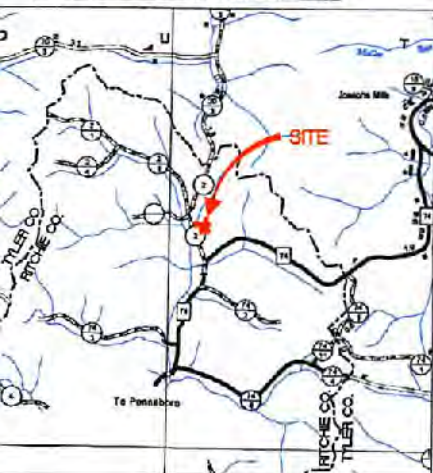
CLAY COUNTY, WEST VIRGINIA
RIVER WATERSHED
ROAD MAP



WEST VIRGINIA STATE PLANE COORDINATE SYSTEM
NORTH ZONE, NAD83
ELEVATION BASED ON NAVD83
ESTABLISHED BY SURVEY GRADE GPS & OPUS
POST-PROCESSING

LETTIE LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (554')	1.94
Access Road "B" (37')	0.05
Staging Area	1.14
Well Pad	6.86
Water Containment Pad	1.47
Excess/Topsoil Material Stockpiles	3.22
Total Affected Area	14.68
Total Wooded Acres Disturbed	
	12.34
Impacts to Christopher K. Haymond TM 4-09	
Access Road "A" (487')	1.70
Access Road "B" (24')	0.02
Staging Area	1.14
Well Pad	6.86
Water Containment Pad	0.76
Excess/Topsoil Material Stockpiles	3.22
Total Affected Area	13.70
Total Wooded Acres Disturbed	
	12.25
Impacts to Michael D. Hammett TM 4-13	
Access Road "A" (67')	0.24
Access Road "B" (13')	0.03
Water Containment Pad	0.71
Total Affected Area	0.98
Total Wooded Acres Disturbed	
	0.09

WVDOH COUNTY ROAD MAP



0 5000
SCALE: 1" = 5000'

MISS Utility of West Virginia
1-800-245-4848
West Virginia State Law
(Section XIV, Chapter 24-C)
Requires that you call two
business days before you dig in
the state of West Virginia.
IT'S THE LAW!!

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Leeroy Unit 1H	N 318123.36 E 1601170.59	N 318162.77 E 1569729.51	N 4357278.66 E 507709.97	LAT 39-21-53.7963 LONG -80-54-37.6009
Leeroy Unit 2H	N 318127.48 E 1601180.55	N 318161.85 E 1569739.47	N 4357278.44 E 507713.01	LAT 39-21-53.7510 LONG -80-54-37.6740
Leeroy Unit 3H	N 318126.58 E 1601190.51	N 318160.98 E 1569749.43	N 4357278.22 E 507716.05	LAT 39-21-53.7457 LONG -80-54-37.5470
Master Unit 1H	N 318125.67 E 1601200.47	N 318160.08 E 1569759.39	N 4357278.00 E 507719.09	LAT 39-21-53.7354 LONG -80-54-37.4200
Master Unit 2H	N 318124.77 E 1601210.43	N 318159.19 E 1569769.35	N 4357277.78 E 507722.13	LAT 39-21-53.7291 LONG -80-54-37.2930
Master Unit 3H	N 318123.88 E 1601220.39	N 318158.29 E 1569779.31	N 4357277.55 E 507725.17	LAT 39-21-53.7218 LONG -80-54-37.1660
Hayes Unit 1H	N 318122.98 E 1601230.35	N 318157.40 E 1569789.27	N 4357277.33 E 507728.21	LAT 39-21-53.7145 LONG -80-54-37.0390
Hayes Unit 2H	N 318122.08 E 1601240.31	N 318156.50 E 1569799.23	N 4357277.11 E 507731.24	LAT 39-21-53.7072 LONG -80-54-36.9121
Christopher Unit 1H	N 318121.19 E 1601250.27	N 318155.61 E 1569809.19	N 4357276.89 E 507734.28	LAT 39-21-53.6999 LONG -80-54-36.7851
Christopher Unit 2H	N 318120.29 E 1601260.23	N 318154.71 E 1569819.15	N 4357276.67 E 507737.32	LAT 39-21-53.6926 LONG -80-54-36.6581
Christopher Unit 3H	N 318119.40 E 1601270.19	N 318153.82 E 1569829.11	N 4357276.44 E 507740.36	LAT 39-21-53.6852 LONG -80-54-36.5311
Well Pad Elevation	970.0			

NOTES:

1. ALL BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF DISTURBANCE ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT IN EXCESS OF 0.5" AND ON A BIWEEKLY BASIS.
2. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.
3. ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP.
4. ANY AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDDED.
5. THE AS-BUILT INFORMATION SHOWN HEREON REFLECTS FIELD DATA COLLECTED RELATING TO THE FINAL GRADING OF THE DISTURBED AREA AS OF MARCH 15, 2018. NAVIUS ENGINEERING IS NOT RESPONSIBLE FOR ANY CHANGES MADE TO THE SITE AFTER THE ABOVE MENTIONED DATES.
6. THE EXISTING CONTAINMENT BERM AROUND THE WELL PAD SHALL BE REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS
7. THE EXISTING EGREGESSES TO THE WELL PAD SHALL HAVE THE MOUNTABLE BERMS REPAIRED AS NECESSARY TO ENSURE 100% CONTAINMENT OF ALL FLUIDS PRIOR TO DRILLING OPERATIONS.

NAVIUS
ENERGY ENGINEERING

Telephone: (888) 662-4185 | www.NaviusEng.com

REVISION

DATE



THIS DOCUMENT
WAS PREPARED FOR:
ANTERO RESOURCES
CORPORATION

COVER SHEET

LETTIE

WELL PAD & WATER CONTAINMENT PAD
CLAY DISTRICT
RITCHIE COUNTY, WEST VIRGINIA



DATE: 03/28/2018

SCALE: AS SHOWN

SHEET 1 OF 5

LEGEND

LEGEND		
EX. INDEX CONTOUR & CONTOUR LABEL		PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR		PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE		PR. INTERMEDIATE CONTOUR
EX. TOP OF BERM		PR. INDEX ROAD
EX. ROAD EDGE OF GRAVEL/DIRT		PR. INTERMEDIATE CONTOUR
EX. ROAD EDGE OF PAVEMENT		PR. PADS/STOCK PILES
EX. ROAD CENTERLINE		PERMITTED LIMIT
EX. GUARDRAIL		MODIFICATION LIMIT
EX. BRIDGE		PR. ROAD/IMPROVEMENT
EX. DITCHLINE/DRAINAGE FEATURE		PR. ROAD CENTERLINE
EX. RIP-RAP		PR. GUARDRAIL
EX. CULVERT		PR. ROCK CONSTRUCTION
EX. TREELINE		PR. AIR BRIDGE
EX. BUILDING		PR. CULVERT
EX. MISCELLANEOUS FEATURE		PR. DITCH
EX. 100 YR FEMA FLOODPLAIN		PR. RIP-RAP TRAIL
EX. DELINEATED STREAM		PR. OUTLET PROTECTION
EX. DELINEATED WETLAND/POND		PR. DIVERSION
100' WETLAND/STREAM BUFFER		PR. ROCK LEVEL
STREAM/WETLAND DELINEATION STUDY AREA		PR. COMPOST FENCE
EX. FENCELINE		PR. SUPER SILT FENCE
EX. GATE		PR. WELL HEAD
EX. PERIMETER SAFETY FENCE		PR. PAD DEWATERING
EX. ACCESS GATE WITH EMERGENCY LIFELINE		PR. TOP OF PAD
EX. WELL HEAD ON DESIGNED PAD		PR. 220' X 320'
EX. GAS WELL		PR. SPOT SHOT
EX. PIPELINE		PR. PERIMETER
EX. PIPELINE R/W		PR. ACCESS GATE
EX. PIPELINE METER		PR. PIPELINE
EX. PIPELINE VALVE		PR. PIPELINE R/W
EX. PIT		PR. OVERHEAD UTILITY
EX. OVERHEAD UTILITY		PR. POWER POLE
EX. POWER POLE/GUY WIRE		PR. OVERHEAD UTILITY
EX. UNDERGROUND ELECTRIC		PR. WATERLINE
EX. UNDERGROUND TELEPHONE		BORING LOCATION
EX. UNDERGROUND FIBER OPTIC		X-SECTION/PROTECTION
EX. UTILITY R/W		X-SECTION/PROTECTION
EX. WATERLINE		X-SECTION/PROTECTION
EX. WATER WELL/EX. SPRING		X-SECTION/PROTECTION
EX. COMPOST SOCK		X-SECTION/PROTECTION
EX. SUPER SILT FENCE		X-SECTION/PROTECTION
EX. SILT FENCE		MATCHLINE
APPROX. LOCATION OF SLIDE AREA		EX. METER
APPROX. LOCATION OF BORROW/ SPOIL AREA		EX. TANK
PR. TOE BENCH		EX. COMBUSTOR
EX. APPROX. SURFACE & SUB-SURFACE ELECTRIC LINE AREA		EX. GPU
EX. APPROX. SURFACE & SUB-SURFACE DUMP LINE AREA		EX. SEPARATOR
EX. APPROX. SURFACE & SUB-SURFACE WELL LINE AREA		EX. VRT
EX. APPROX. SURFACE & SUB-SURFACE SALES LINE AREA		EX. KNOCK-OUT

CONTOUR (10' INTERVAL) & CONTOUR LABEL	
CONTOUR (2' INTERVAL)	
CONTOUR (1' INTERVAL)	
CONTOUR (10' INTERVAL) & CONTOUR LABEL	
ROAD CONTOUR (2' INTERVAL)	
PILE TOPO LIMITS	
LIMITS OF DISTURBANCE	
LIMITS OF DISTURBANCE	
ADJACENT EDGE OF GRAVEL	
LINE	
CONSTRUCTION ENTRANCE	
PEZONDAI DITCH	
SECTION	
SPREADER	
WATER SOCK	
FENCE	
IRIGATING SYSTEM	
CONTAINMENT BERM	
PAD FOOTPRINT	
SAFETY FENCE	
WITH EMERGENCY LIFELINE	
UTILITY	
UTILITY GUY WIRE	
UTILITY R/W	
GRID INDEX	
GRID INTERMEDIATE	
PROPOSED GRADE	
EXISTING GRADE	
WATER SURFACE	
CULVERT	
EX. STAIRS/CATWALK	
EX. DEWATERING SYSTEM	
EX. PIG LAUNCHER	
EX. SECONDARY CONTAINMENT	
EX. ABOVE-GND VAPOR LINE	
EX. ESD	
EX. MAILBOX	
EX. CONTROL PT.	
EX. MUSTER AREA	

REVISION	DATE



LEGEND

LETTIE

WELL PAD & WATER CONTAINMENT PAD

CLAY DISTRICT

RITCHIE COUNTY, WEST VIRGINIA

RECEIVED
Office of Oil and Gas

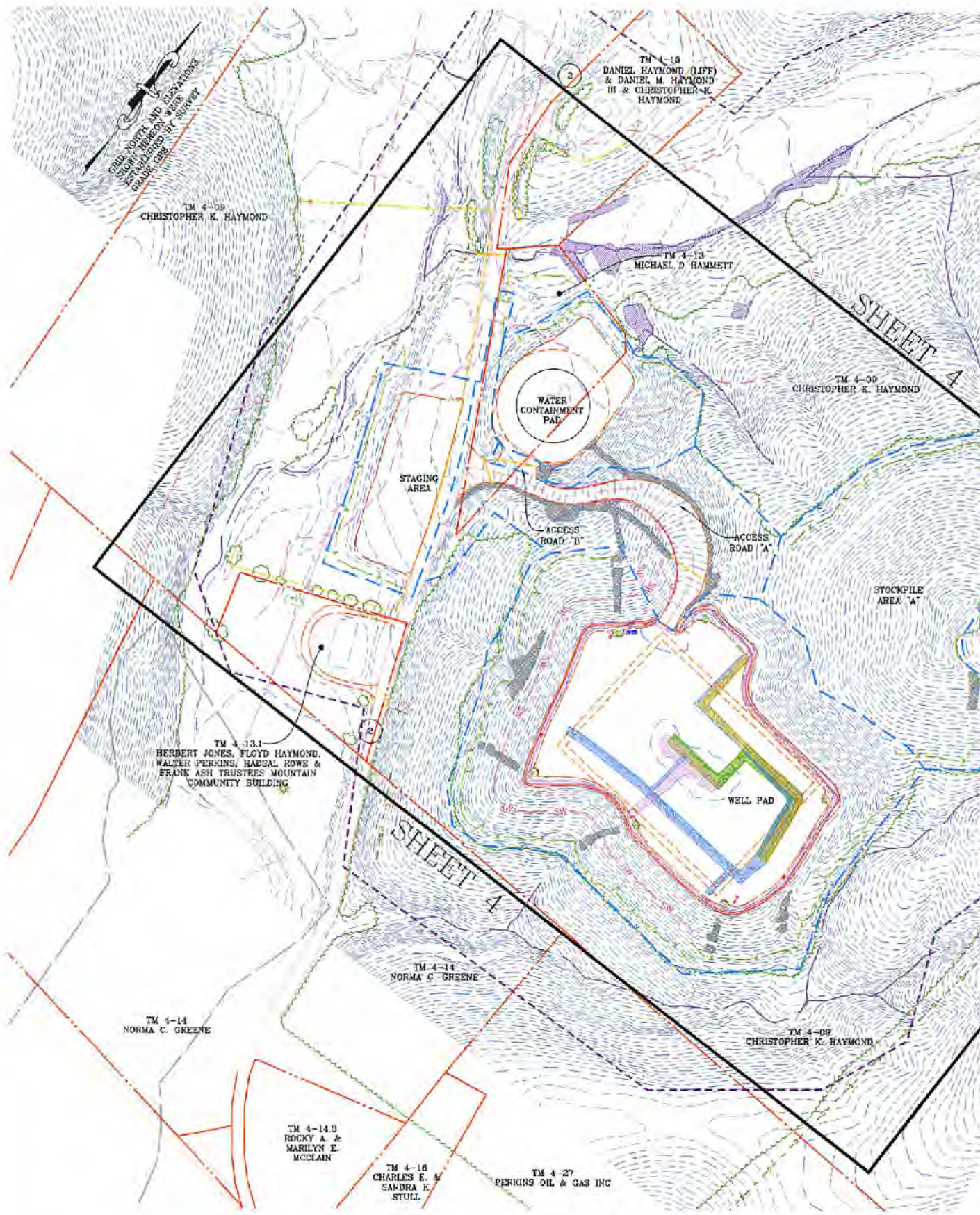
JUL 23 2018

WV Department of
Environmental Protection

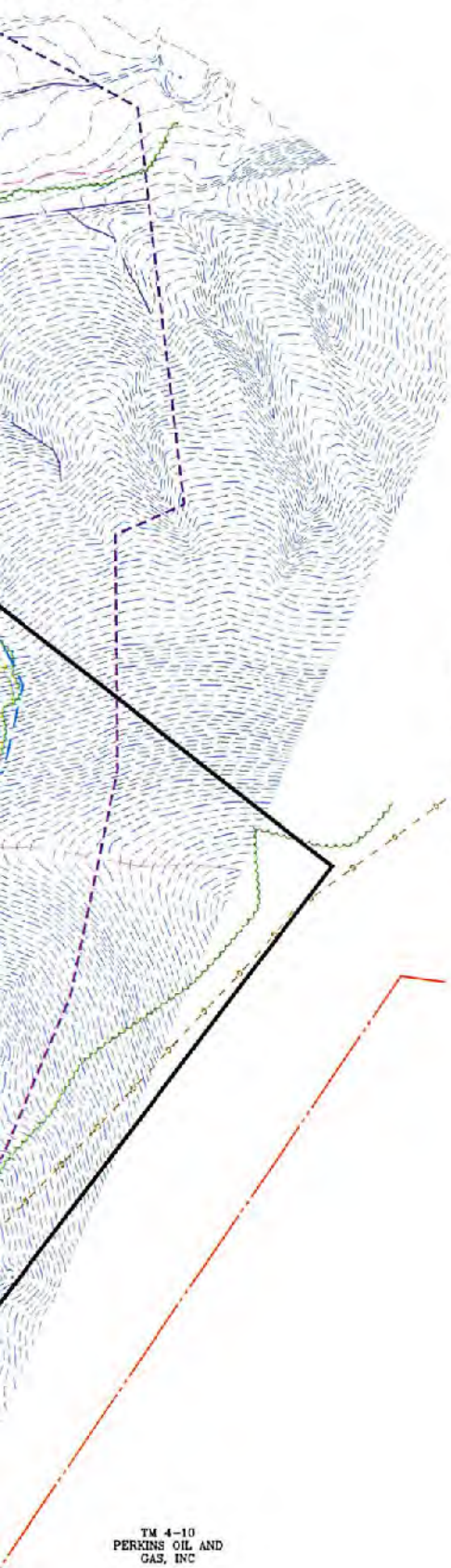


DATE: 03/26/2018
SCALE: N/A
SHEET 2 OF 5

OVERALL PLAN S



SHEET INDEX



GENERAL NOTES:

1. THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON APRIL 6, 2014 AERIAL PHOTOGRAPHY COMPILED MAY, 2014 BY BLUE MOUNTAIN AERIAL MAPPING, HURTON, WEST VIRGINIA.
2. AS-BUILT INFORMATION SHOWN HEREON IS BASED ON FIELD SURVEY PERFORMED BY NAVITUS ENGINEERING, INC. IN BETWEEN SEPTEMBER 11, 2017 & MARCH 15, 2017.
3. THE PROPERTY LINES SHOWN HEREON DO NOT REPRESENT A BOUNDARY SURVEY ON ANY OF THE PARCELS SHOWN. PROPERTY CORNERS AND LINES PERTINENT TO WELL LOCATION ARE BASED ON A FIELD SURVEY. THE REMAINDER OF THE PROPERTY LINES ARE BASED ON COUNTY REAL ESTATE TAX MAPS, GIS INFORMATION AND DEEDS OF RECORD.
4. UTILITIES AND THEIR LOCATIONS AS SHOWN HEREON ARE BASED ON: A) OBSERVABLE EVIDENCE OF THOSE VISIBLE, ABOVE-GROUND FACILITIES, FEATURES, AND MARKERS WHICH WERE FOUND ON THE SUBJECT PROPERTY AT THE TIME OF SURVEY PERFORMED BY NAVITUS ENGINEERING AND B) FIELD MARKINGS PLACED BY UTILITY COMPANIES IN RESPONSE TO THE WV 811 TICKET SUBMITTED BY NAVITUS ENGINEERING. NAVITUS ENGINEERING CANNOT GUARANTEE THE ACCURACY OF THE UTILITY MARKINGS PERFORMED BY OTHERS OR THAT ALL UTILITIES EXISTING WITHIN THE LIMITS OF THIS PLAN ARE SHOWN. ANY UTILITIES ENCOUNTERED SUBSEQUENT TO PLAN APPROVAL OR DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE PLAN SHOULD BE REPORTED TO NAVITUS ENGINEERING AND ANTERO RESOURCES CORPORATION.

TM 4-10
PERKINS OIL AND
GAS, INC

RECEIVED
Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection

NAVITUS
ENERGY ENGINEERING
Telephone: (888) 662-4185 | www.NavitusEng.com

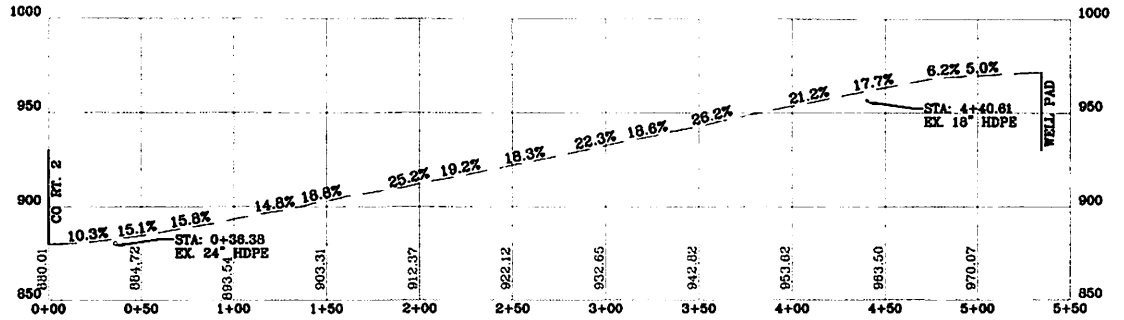
REVISION	DATE

THIS DOCUMENT
WAS PREPARED FOR:
ANTERO RESOURCES
CORPORATION

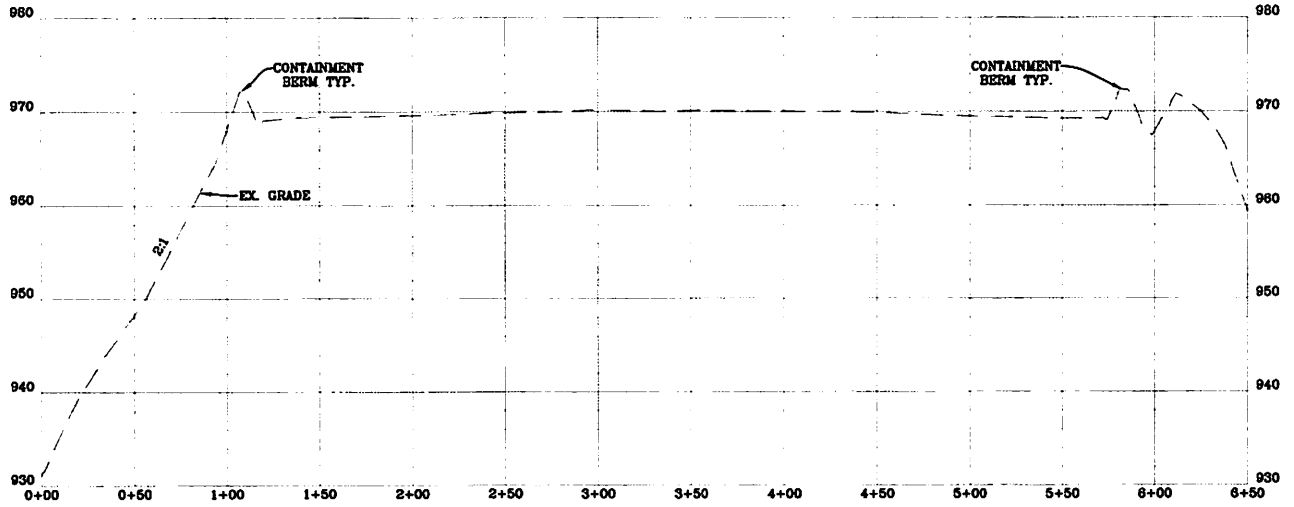
OVERALL PLAN SHEET INDEX
LETTIE
WELL PAD & WATER CONTAINMENT PAD
CLAY DISTRICT
RITCHIE COUNTY, WEST VIRGINIA

DATE: 03/26/2018
SCALE: 1" = 100'
SHEET 3 OF 5

ACCESS ROAD AS-BUILT PROFILE CONTAINMENT PAD, & STOCKPI

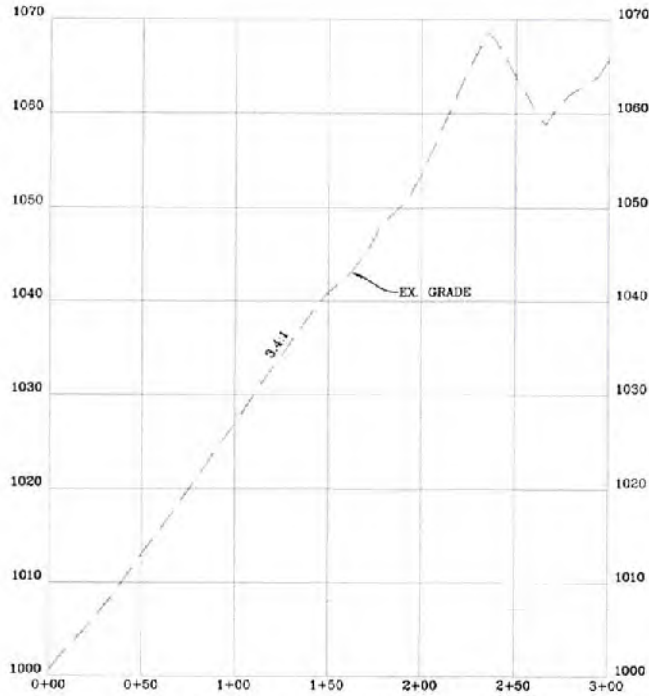


ACCESS ROAD "A" AS-BUILT PROFILE
SCALE: HORIZ. 1" = 50' VERT. 1" = 50'



WELL PAD AS-BUILT CROSS-SECTION "A-A"
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

PROFILE, WELL PAD, WATER CONTAINMENT PAD AS-BUILT SECTIONS



STOCKPILE AREA "A" AS-BUILT CROSS-SECTION "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

RECEIVED
Office of Oil and Gas

JUL 23 2018

WV Department of
Environmental Protection

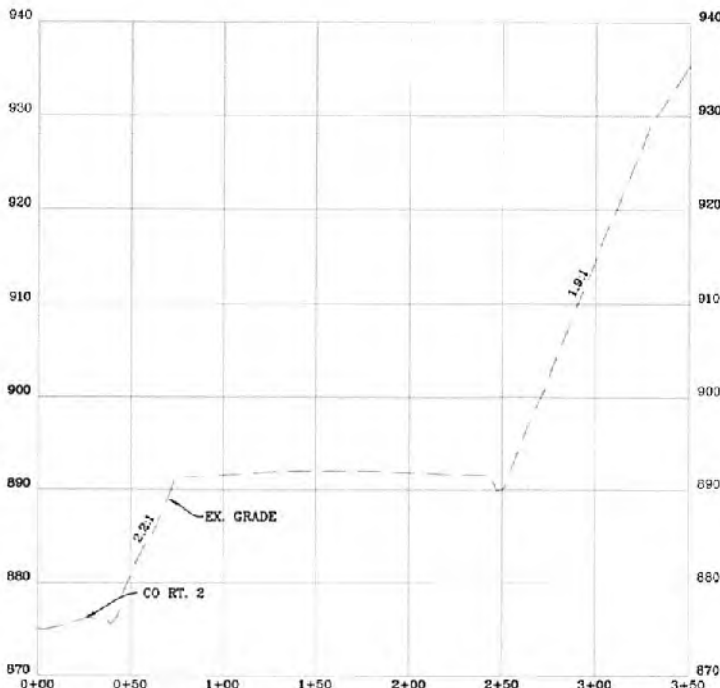


REVISION

DATE



THIS DOCUMENT
WAS PREPARED FOR:
ANTERO RESOURCES
CORPORATION



WATER CONTAINMENT PAD AS-BUILT CROSS-SECTION "B-B"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

ACCESS ROAD AS-BUILT PROFILES, WELL PAD,
WCP, & STOCKPILE AS-BUILT SECTIONS
LETTIE
WELL PAD & WATER CONTAINMENT PAD
CLAY DISTRICT
RITCHIE COUNTY, WEST VIRGINIA



DATE: 03/26/2018

SCALE: AS SHOWN

SHEET 5 OF 5