



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

Friday, January 18, 2019
WELL WORK PERMIT
Vertical / Plugging

ANTERO RESOURCES CORPORATION
1615 WYNKOOP STREET
DENVER, CO 80202

Re: Permit approval for 1
47-017-03069-00-00

This well work permit 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 any additional specific 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 of 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.

Per 35 CSR 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- 0450.

James A. Martin
Chief

Operator's Well Number: 1
Farm Name: HILL, G. W.
U.S. WELL NUMBER: 47-017-03069-00-00
Vertical Plugging
Date Issued: 1/18/2019

I

47-07-03069A
01/18/2019

PERMIT CONDITIONS

West Virginia Code §22-6-11 allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. All pits must be lined with a minimum of 20 mil thickness synthetic liner.
2. In the event of an accident or explosion causing loss of life or serious personal injury in or about the well or while working on the well, the well operator or its contractor shall give notice, stating the particulars of the accident or explosion, to the oil and gas inspector and the Chief within twenty-four (24) hours.
3. Well work activities shall not constitute a hazard to the safety of persons.
4. This well is under a consent order and must be plugged under the terms of that agreement.

- 1) Date October 26, 2018
- 2) Operator's
Well No. Hill, G.W. #1 _____
- 3) API Well No. 47-017 - 03069

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

APPLICATION FOR A PERMIT TO PLUG AND ABANDON

- 4) Well Type: Oil ____/ Gas X/ Liquid injection ____/ Waste disposal ____/
(If "Gas, Production ____ or Underground storage ____) Deep ____/ ShallowX

- 5) Location: Elevation 301m Watershed North Fork Hughes River
District Central County Doddridge Quadrangle Pennsboro 7.5'

- 6) Well Operator Antero Resources Corporation 7) Designated Agent CT Corporation System - Dianna Stamper
Address 1615 Wynkoop Street Address 5400 D Big Tyler Road
Denver, CO 80202 Charleston, WV 25313

- 8) Oil and Gas Inspector to be notified 9) Plugging Contractor
Name Daniel Flack Name N/A - Antero will plug well
Address 601 57th Street SE Address _____
Charleston, WV 25304

10) Work Order: The work order for the manner of plugging this well is as follows:

*Please See Attached Work Order

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Office of Oil and Gas
OCT 30 2018
WV Department of
Environmental Protection

OK gwm
1/18/19

Notification must be given to the district oil and gas inspector 24 hours before permitted work can commence.

Work order approved by inspector OK _____ Date _____

Antero Resources
1615 Wynkoop St.
Denver, CO 80202
Office: 303.357.7310
Fax: 303.357.7315



Hill, G.W. #1
Doddridge County, WV
API #47-017-03069

Objective: Plug and Abandon Wellbore.

Pipe Schedule:

- Conductor Set @ 397' – 8 5/8"
- Production Casing @ 2,375' – 4.5"

Water Zone

1. Fresh Water: 100'
2. Unknown Water: 1,503'

Oil and Gas Zones:

1. Big Injun: 1890-1960'
2. Weir: 2389' (Top); Perfs @ 2,040'

Procedure:

1. Check and record all casing/annular pressures into Wellview.
2. Coordinate and schedule casing jacks.
3. Notify WVDEP prior to commencing work, for plug witnessing (Doddridge County Inspector – Daniel Flack)
4. Move in and rig up flat tank and frac tank (No pits will be utilized).
5. Move in rig up service unit.
6. JU head and test - check and report surface pressure including bradenhead pressure.
7. Bleed off any pressure & shut in to monitor pressure buildup. If zero, continue with procedure and pick up tubing.
8. Pick up 2-3/8" tubing workstring and RIH to 2,070-ft.
9. MIRU cement services. Mix and pump 26 sacks (Class A cement + 2% CaCl₂, 20% excess included yield = 1.18 ft³/sk, WR=5.2 gal/sk) Plug should cover from 1,790'-2,070.
 - a. Displace to balance plug
 - b. Slowly pull out of cement plug and LD 200' of tubing.
 - c. Reverse circulate tubing clear of cement
 - d. Wait on cement 8hrs.
 - e. RIH w/ tubing and tag TOC at 1,790.
 - f. If top of cement is deeper than 1,790', mix and spot cement so top is a minimum depth of 1,790'.
 - g. Repeat steps until TOC is shallower than 1,790'.
 - h. Tag TOC after each/every plug set.
10. POOH with tubing.
11. Rig up and TIH with cement bond log tool under a packoff to evaluate cement behind 4 1/2" casing. Estimate the amount of 4 1/2" casing to be recovered.
12. If needed, RIH with wireline and free point tool above top of cement (in 4 1/2" casing).
 - a. Chemical or mechanical cut at xxx' (depth as determined via freepoint and CBL)
 - b. RU casing jacks and POOH and LD 4.5" casing.
13. Determine if cement plugs can be pumped down 4 1/2" casing after the cut and while laying down the casing. If so, pump the following plugs from surface down casing.

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Environmental Protection

14. If pumping plug down 4 ½" casing, pump a 400' elevation plug using 87 sks (Class A cement + 2% CaCl₂, 20% excess included yield =1.18 ft³/sk, WR=5.2 gal/sk). Plug should cover 400' above cut casing.
 - a. Trip out of hole and wait on cement
 - b. Tag TOC 400' above 4.5" casing cut.
15. If cement plug is required 200' above casing cut and 200' below casing cut, 2-3/8" tubing will have to be run back in the hole after 4 ½" casing is laid down.
16. If pumping plug down 2-3/8" tubing, pump a 400' elevation plug using 87 sks (Class A cement + 2% CaCl₂, 20% excess included yield =1.18 ft³/sk, WR=5.2 gal/sk). Plug should cover 200' above cut casing and 200' below cut casing.
 - a. Trip out of hole and wait on cement
17. Tag TOC 200' above 4.5" casing cut.
18. Mix and pump 182 sacks from 497'-3' (depth per elevation cut) (Class A cement + 2% CaCl₂, 20% excess included yield =1.18 ft³/sk, WR=5.2 gal/sk) Plug should cover from 447' to elevation cut.
 - a. TOOH
 - b. Wait on cement 8 hrs.
19. Cut off casing at 3' below ground level.
20. Weld marker plate with API No.: 47-017-03069

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Wellbore Diagram

6/1/2016

Elev.: 990'

Spud: 2/13/1982

Plug from 497' to 3'
(182 sks)

8 5/8" Conductor Casing
Set @ 397'
Cemented to surface

6%
GEL

400' plug (87 sks)
200' below and above
4.5" casing cut

TOC @ ?'

7-7/8" open hole →

6% GEL

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*No CIBP
from
1/17/19*

Set CIBP 1,790'
Plug 1,790'-2,070' (26 sks)
280

Weir Perforations:
2,040'

6%
GEL

4-1/2" Production Casing
Set @ 2,375' w/ ??? sks

TD @ 2,400'

Antero Resources Corporation

Hill, G.W. #1

API: 47-017-03069

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FORM IV-35
(Observer)

(08-74)

APR 23 1982

OIL AND GAS DIVISION
DEPARTMENT OF MINES

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES, OIL AND GAS DIVISION

WELL OPERATOR'S REPORT
OF

PLUGGING, FRACTURING AND/OR STIMULATING, OR PHYSICAL CHANGE

Date: April 22, 1982

Operator's Name: Watkins & Watkins
Well No.: No. 1

API Well No.: 17-017-3069
State County Permit

WELL TYPE: Oil / Gas / Liquid Injection / Waste Disposal
(If Gas, Production / Underground storage / Deep Shallow)
LOCATION: Elevation: 990 Watershed: Cabin Run Hughes River
District: Central County: Doddridge Quadrangle: Pennsboro
WELL OPERATOR: Watkins & Watkins DESIGNATED AGENT: Watkins & Watkins
Address: Box 386 Address: Box 386
Lumberport, W.V. Lumberport W.V.

PERMITTED WORK: Drill / Convert / Drill deeper / Redrill / Fracture or stimulate
Plug off old formation / Perforate new formation /
Other physical change in well (specify) _____

PERMIT ISSUED ON Dec. 28, 19 81

OIL & GAS INSPECTOR FOR THIS WORK:

(IF APPLICABLE: PLUGGING OF DRY HOLE (IN CONTINUOUS PROGRESSION FROM DRILLING OR REMORNING, VERBAL PERMISSION OBTAINED

Name: Steve Casey
Address: Jane Lew W. V.

GEOLOGICAL TARGET FORMATION: Weir Depth 2400 feet
Depth of completed well, 2,400 feet Rotary / Cable Tools
Water strata depth: Fresh, 90 feet; salt, _____ feet.
Coal seam depths: None Is coal being mined in the area? NO
Work was commenced 2-6-82, 19 82, and completed 2-13, 19 82

CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	Size	SPECIFICATIONS			FOOTAGE INTERVALS		CEMENT FILL-UP OR SACKS (Cubic feet)	PACKERS
		Grade	Weight per ft.	New	Used	For drilling		
Conductor	113/4	23 #	X					Kinds
Fresh water	85/8	20 #	X			397'	To surface	Sizes
Coal								
Intermediate								
Production	4 1/2					2,375	300' above	Fracturing horizon
Tubing								
liners								Perforations:
								Top Bottom
								1970 2040

OPEN FLOW DATA

Producing formation Big Injun Pay zone depth 1970 - 1990 feet

Gas: Initial open flow, 20,000 Mcf/d Oil: Initial open flow, 0 Bbl/d

Final open flow, 50,000 Mcf/d Final open flow, 1 Bbl/d

Time of open flow between initial and final tests, 2 hours

Static rock pressure, 250 # psig (surface measurement) after 8 hours shut in

[If applicable due to multiple completion--]

Second producing formation Weir Pay zone depth 2020-2040 feet

Gas: Initial open flow, 30,000 Mcf/d Oil: Initial open flow, 0 Bbl/d

Final open flow, 300,000 Mcf/d Final open flow, 1 Bbl/d

Time of open flow between initial and final tests, 24 hours

Static rock pressure, 990 psig (surface measurement) after 24 hours shut in

FORM IV-35
(Reverse)
(08-78)

DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGES, ETC.

017-3069

WELL LOG

FORMATION	Color	Hard or Soft	Top Feet	Bottom Feet	Remarks Including indication of all fresh and salt water, coal, oil and gas
Shale			0	75	
Red Rock			75	110	
Shale			110	385	Water Fresh 100'
Sand			415	437	
R. Rock			437	468	
Sand			468	495	
Shale			495	555	
Sand			555	610	
Shale			610	670	
Sand			670	700	
Shale			700	1040	
Sand			1040	1100	
Shale			1100	1130	
Sand			1130	1315	
Shale			1315	1410	
Sand			1410	1545	Water 1503
Shale			1545	1650	
Sand			1650	1717	
Shale			1717	1840	
Sand			1840	1867	
Shale			1867	1890	
Sand			1890	2055	
Shale			2055	2250	
Sand			2389	2400	

(Attach separate sheets to complete as necessary)

Watkins & Watkins
Well Operator

By Thomas J. Fluharty
Its Drilling Supervisor

NOTE: Regulation 2.02(f) provides as follows:

"The term 'log' or 'well log' shall mean a systematic, detailed geological record of all formations, including coal, encountered in the drilling of a well."

47-017-03069P
01/18/2019

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FORM IV-35
(Obverse)

(08-78)

APR 23 1982

OIL AND GAS DIVISION
DEPARTMENT OF MINES

STATE OF WEST VIRGINIA
DEPARTMENT OF MINES, OIL AND GAS DIVISION

WELL OPERATOR'S REPORT
OF

DRILLING, FRACTURING AND/OR STIMULATING, OR PHYSICAL CHANGE

Date: April 22, 1982

Operator's Name: Watkins & Watkins
Well No.: No. 1

API Well No.: 17-017-3069
State County Perm:

WELL TYPE: Oil / Gas / Liquid Injection / Waste Disposal
(If "Gas", Production / Underground storage / Deep / Shallow)
LOCATION: Elevation: 990 Watershed: Cabin Run Hughes River
District: Central County: Doddridge Quadrangle: Pennsboro
WELL OPERATOR: Watkins & Watkins DESIGNATED AGENT: Watkins & Watkins
Address: Box 386 Address: Box 386
Lumberport, W.V.: Lumberport W.V.

PERMITTED WORK: Drill / Convert / Drill deeper / Redrill / Fracture or stimulate
Plug off old formation / Perforate new formation /
Other physical change in well (specify):

PERMIT ISSUED ON Dec. 28, 1981 OIL & GAS INSPECTOR FOR THIS WORK:
(IF APPLICABLE: PLUGGING OF DRY HOLE OR CONTINUOUS PROGRESSION FROM DRILLING OR REWORKING. VERBAL PERMISSION OBTAINED) Name: Steve Casey
Address: Jane Lew W. V.

GEOLOGICAL TARGET FORMATION: Weir Depth 2400 feet
Depth of completed well, 2400 feet Rotary / Cable Tools
Water strata depth: Fresh, 90 feet; salt, feet.
Coal seam depths: None Is coal being mined in the area? NO
Work was commenced 2-6-82, 1982, and completed 2-13-82, 1982

CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	Size	SPECIFICATIONS		FOOTAGE INTERVALS		CEMENT FILL-UP OR SACKS (Cubic feet)	PACKERS
		Weight per ft	New	Used	For drilling		
Conductor	113/4	23 #	<input checked="" type="checkbox"/>				Kinds
Fresh water	85/8	20 #	<input checked="" type="checkbox"/>			397' To surface	Sizes
Coal							
Intermediate							
Production	4 1/2					2,375 300' above	300' above
Tubing							horizon
liners							Perforations:
							Top Bottom
							1970 2040

OPEN FLOW DATA

Producing formation: Big Injun Pay zone depth 1970 - 1990 feet

Gas: Initial open flow, 20,000 Mcf/d Oil: Initial open flow, 0 Bbl/d
Final open flow, 50,000 Mcf/d Final open flow, 1 Bbl/d
Time of open flow between initial and final tests, 2 hours

Static rock pressure, 250 # psig (surface measurement) after 8 hours shut in
(If applicable due to multiple completion--)

Second producing formation: Weir Pay zone depth 2020-2040 feet

Gas: Initial open flow, 30,000 Mcf/d Oil: Initial open flow, 0 Bbl/d
Final open flow, 300,000 Mcf/d Final open flow, 1 Bbl/d
Time of open flow between initial and final tests, 24 hours

Static rock pressure, 990 # psig (surface measurement) after 24 hours shut in

FORM IV-35
(Reverse)
(05-78)

DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC.

017-3069

WELL LOG

FORMATION	Color	Hard or Soft	Top Feet	Bottom Feet	Remarks Including indication of all fresh and salt water, coal, oil and gas
Shale			0	75	
Red Rock			75	110	
Shale			110	385	Water Fresh 100'
Sand			415	437	
R. Rock			437	468	
Sand			468	495	
Shale			495	555	
Sand			555	610	
Shale			610	670	
Sand			670	700	
Shale			700	1040	
Sand			1040	1100	
Shale			1100	1130	
Sand			1130	1315	
Shale			1315	1410	
Sand			1410	1545	Water 1503
Shale			1545	1650	
Sand			1650	1717	
Shale			1717	1840	
Sand			1840	1867	
Shale			1867	1890	
Sand			1890	2055	
Shale			2055	2250	
Sand			2389	2400	

(Attach separate sheets to complete as necessary)

Watkins & Watkins
Well Operator

By Thomas J. Fluharty

Its Drilling Supervisor

NOTE: Regulation 2.02(f) provides as follows:

"The term 'log' or 'well log' shall mean a systematic, detailed geological record of all formations, including coal, encountered in the drilling of a well."

WW-4A
Revised 6-07

1) Date: 10/26/2018
2) Operator's Well Number
GW Hill #1 _____
3) API Well No.: 47 - 017 - 03069

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
NOTICE OF APPLICATION TO PLUG AND ABANDON A WELL

4) Surface Owner(s) to be served:	5) (a) Coal Operator
(a) Name <u>Antero Resources Corporation (8-38 & 8-23.1)</u>	Name _____
Address <u>1615 Wynkoop St</u>	Address _____
<u>Denver, CO 80202</u>	_____
(b) Name _____	(b) Coal Owner(s) with Declaration
Address _____	Name _____
_____	Address _____
(c) Name <u>WV DOH Right of Way</u>	Name _____
Address <u>WV Dept of Transportation</u>	Address _____
<u>Division of Highways</u>	_____
<u>c/o Mike Davis</u>	_____
<u>PO BOX 4220</u>	_____
<u>Clarksburg, WV 26302</u>	_____
6) Inspector <u>Daniel Flack</u>	(c) Coal Lessee with Declaration
Address <u>601 57th Street SE</u>	Name _____
<u>Charleston, WV 25304</u>	Address _____
Telephone <u>304 575-0109</u>	_____

TO THE PERSONS NAMED ABOVE: You should have received this Form and the following documents:

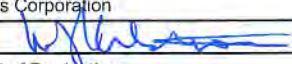
- (1) The application to Plug and Abandon a Well on Form WW-4B, which sets out the parties involved in the work and describes the well its and the plugging work order; and
- (2) The plat (surveyor's map) showing the well location on Form WW-6.

The reason you received these documents is that you have rights regarding the application which are summarized in the instructions on the reverses side. However, you are not required to take any action at all.


Take notice that under Chapter 22-6 of the West Virginia Code, the undersigned well operator proposes to file or has filed this Notice and Application and accompanying documents for a permit to plug and abandon a well with the Chief of the Office of Oil and Gas, West Virginia Department of Environmental Protection, with respect to the well at the location described on the attached Application and depicted on the attached Form WW-6. Copies of this Notice, the Application, and the plat have been mailed by registered or certified mail or delivered by hand to the person(s) named above (or by publication in certain circumstances) on or before the day of mailing or delivery to the Chief.

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Office of Oil and Gas

OCT 30 2018

Well Operator	<u>Antero Resources Corporation</u>
By:	<u>Kevin Kilstrom</u> 
Its:	<u>Sr Vice President of Production</u>
Address	<u>1615 Wynkoop Street</u>
	<u>Denver, CO 80202</u>
Telephone	<u>303-357-7310</u>

WV Department of
Environmental Protection

Subscribed and sworn before me this 26 day of October 2018
 Notary Public
My Commission Expires 3/29/2022

KARIN COX
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20184014160
MY COMMISSION EXPIRES MARCH 29, 2022

Oil and Gas Privacy Notice

The Office of Oil and Gas processes your personal information, such as name, address and phone number, as a part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact DEP's Chief Privacy Officer at depprivacyoffier@wv.gov.

SURFACE OWNER WAIVER

Operator's Well
Number

Hill, GW #1

INSTRUCTIONS TO SURFACE OWNERS NAMED ON PAGE WW4-A

The well operator named on page WW-4A is applying for a permit from the State to plug and abandon a well. (Note: If the surface tract is owned by more than three persons, then these materials were served on you because your name appeared on the Sheriff's tax ticket on the land or because you actually occupy the surface tract. In either case, you may be the only owner who will actually receive these materials.) See Chapter 22 of the West Virginia Code. Well work permits are valid for 24 months. If you do not own any interest in the surface tract, please forward these materials to the true owner immediately if you know who it is. Also, please notify the well operator and the Office of Oil and Gas.

**NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.
WHERE TO FILE COMMENTS AND OBTAIN ADDITIONAL INFORMATION:**

Chief, Office of Oil and Gas
Department of Environmental Protection
601 57th St. SE
Charleston, WV 25304
(304) 926-0450

Time Limits and methods for filing comments. The law requires these materials to be served on or before the date the operator files his Application. You have **FIVE (5) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

Comments must be in writing. Your comments must include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

The Chief has the power to deny or condition a well work permit based on comments on the following grounds:

- 1) The proposed well work will constitute a hazard to the safety of persons.
- 2) The soil erosion and sediment control plan is not adequate or effective;
- 3) Damage would occur to publicly owned lands or resources;
- 4) The proposed well work fails to protect fresh water sources or supplies;
- 5) The applicant has committed a substantial violation of a previous permit or a substantial violation of one or more of the rules promulgated under Chapter 22, and has failed to abate or seek review of the violation...".

If you want a copy of the permit as it is issued or a copy of the order denying the permit, you should request a copy from the Chief.

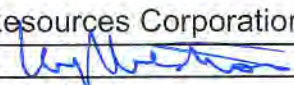
VOLUNTARY STATEMENT OF NO OBJECTION

I hereby state that I have read the instructions to surface owners and that I have received copies of a Notice and Application For A Permit To Plug And Abandon on Forms WW-4A and WW-4B, and a survey plat.

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials.

FOR EXECUTION BY A NATURAL PERSON
ETC.

FOR EXECUTION BY A CORPORATION,

_____	Date _____	Name Antero Resources Corporation	_____
Signature		By Kevin Kilstrom 	
		Its SR VP - Production	Date 10/26/2018
		Signature _____	Date 10/26/2018

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Office of Oil and Gas
OCT 30 2018
WV Department of
Environmental Protection

47-017-03069
01/18/2019

WW-9
(5/16)

API Number 47 - 017 - 03069
Operator's Well No. Hill GW #1

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) North Fork Hughes River Quadrangle Pennsboro 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes No

Will a pit be used? Yes No

If so, please describe anticipated pit waste: _____

Will a synthetic liner be used in the pit? Yes No If so, what ml.? _____

Proposed Disposal Method For Treated Pit Wastes:

- Land Application (if selected provide a completed form WW-9-GPP)
- Underground Injection (UIC Permit Number *UIC Permit # will be provided on Form WR-34)
- Reuse (at API Number Future permitted well locations when applicable. API# will be provided on Form WR-34)
- Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98)
- Other (Explain Northwestern Landfill Permit #SWF-1025/WV0109410)

Will closed loop system be used? If so, describe: Yes, fluids stored in tanks, cuttings removed off site and taken to landfill.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc.

-If oil based, what type? Synthetic, petroleum, etc.

Additives to be used in drilling medium? _____

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Office of Oil and Gas

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc.

OCT 30 2013

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) _____

WV Department of
Environmental Protection

-Landfill or offsite name/permit number? _____

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on April 1, 2016, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature *Gretchen Kohler*

Company Official (Typed Name) Gretchen Kohler

Company Official Title Senior Environmental & Regulatory Manager

Subscribed and sworn before me this 26 day of Oct, 20 18

[Signature]

Notary Public

My commission expires 3/29/2022

KARIN COX
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20184014160
MY COMMISSION EXPIRES MARCH 29, 2022

Proposed Revegetation Treatment: Acres Disturbed 8.06 Prevegetation pH _____

Lime 2-3 Tons/acre or to correct to pH 6.5

Fertilizer type _____

Fertilizer amount 500 lbs/acre

Mulch 2-3 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40
Field Bromegrass	40

Seed Type	lbs/acre
Crownvetch	10-15
Tall Fescue	30

Please reference Table IV-3 on page 7 of the Well #1 Plugging Plan

Please reference Table IV-4A on page 7 of the Well #1 Plugging Plan

***or type of grass seed requested by surface owner**

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, provide water volume, include dimensions (L, W, D) of the pit, and dimensions (L, W), and area in acres, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: _____

Comments: _____

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OCT 30 2018

WV Department of
Environmental Protection

Title: _____ Date: _____

Field Reviewed? () Yes () No

01/18/2019



Antero Resources Corporation
 GW Hill #1



Antero Resources Corporation

Appalachian Basin

GW Hill #1

Doddridge County

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OCT 30 2018

Quadrangle: Pennsboro
 Watershed: North Fork Hughes River
 District: Central
 Date: 10-23-2018

WV Department of
 Environmental Protection



WW-7
8-30-06



West Virginia Department of Environmental Protection
Office of Oil and Gas
WELL LOCATION FORM: GPS

API: 47-017-03069 WELL NO.: 1

FARM NAME: N/A

RESPONSIBLE PARTY NAME: Antero Resources Corporation

COUNTY: Doddridge DISTRICT: Central

QUADRANGLE: Pennsboro

SURFACE OWNER: Antero Treatment LLC

ROYALTY OWNER: N/A

UTM GPS NORTHING: 4346330.58 m

UTM GPS EASTING: 508811.45 m GPS ELEVATION: 301.0 m

The Responsible Party named above has chosen to submit GPS coordinates in lieu of preparing a new well location plat for a plugging permit or assigned API number on the above well. The Office of Oil and Gas will not accept GPS coordinates that do not meet the following requirements:

1. Datum: NAD 1983, Zone: 17 North, Coordinate Units: meters, Altitude: Office of Oil and Gas
height above mean sea level (MSL) – meters.

2. Accuracy to Datum – 3.05 meters

3. Data Collection Method:

Survey grade GPS : Post Processed Differential _____

Real-Time Differential

Mapping Grade GPS : Post Processed Differential _____

Real-Time Differential

4. Letter size copy of the topography map showing the well location.

I the undersigned, hereby certify this data is correct to the best of my knowledge and belief and shows all the information required by law and the regulations issued and prescribed by the Office of Oil and Gas.

[Signature]
Signature

Permitting Agent
Title

10/26/2018
Date

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01/18/2019

API#47-017- WELL # WELL PLUGGING

CENTRAL DISTRICT, DODDRIDGE
CABIN RUN-NORTH FORK RIVER

PENNSBORO & WEST UNION USGS

LOCATION COORDINATES:

ACCESS ROAD ENTRANCE
LATITUDE: 39.270624 LONGITUDE: -80.890409 (NAD 83)
N 4346814.49 E 509453.45 (UTM ZONE 17 METERS)

CENTROID OF PAD
LATITUDE: 39.266310 LONGITUDE: -80.897897 (NAD 83)
N 4346334.95 E 508808.07 (UTM ZONE 17 METERS)

GENERAL DESCRIPTION:

THE EXISTING ACCESS ROAD AND WELL PAD ARE BEING UPGRADED TO AID IN THE PLUGGING OF EXISTING INDIVIDUAL GAS WELL.

FLOODPLAIN NOTES:

THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54017C0100C.

MISS UTILITY STATEMENT:

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

ENTRANCE PERMIT:

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

GEOTECHNICAL NOTES:

NO SOIL STUDIES OR SUBSURFACE INVESTIGATIONS WERE PERFORMED AND ANALYZED FOR THE DESIGN OF THIS SITE.

ENVIRONMENTAL NOTES:

STREAM AND WETLAND DELINEATIONS WERE PERFORMED BY ALLSTAR ECOLOGY, LLC, FROM DELINEATIONS OF THE PROJECT AREA PERFORMED JANUARY 2015. STREAM AND WETLAND DELINEATIONS WERE PERFORMED BY GAI CONSULTANTS, INC. FROM DELINEATIONS OF THE PROJECT AREA PERFORMED MAY 2015.

PROJECT CONTACTS:

OPERATOR:

ANTERO RESOURCES CORPORATION
535 WHITE OAKS BLVD.
BRIDGEPORT, WV 28330
PHONE: (304) 842-4100
FAX: (304) 842-4102

ELI WAGONER - ENVIRONMENTAL ENGINEER
OFFICE: (304) 842-4068 CELL: (304) 476-9770

JON McEVERS - OPERATIONS SUPERINTENDENT
OFFICE: (303) 357-6799 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

TIM RAINS - LAND AGENT
OFFICE: (304) 842-4290 CELL: (405) 641-3536

ENGINEER/SURVEYOR:

NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (888) 682-4185 CELL: (540) 686-6747



WEST VIRGINIA COUNTY MAP



(NOT TO SCALE)

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REPRODUCTION NOTE

THESE PLANS WERE CREATED TO BE PLOTTED ON 22"x34" (ANSI D) 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.

CONSTRUCTION AND E&S

CONSTRUCTION NOTES:

1. THE CONTRACTOR IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND WILL NOTIFY NAVITUS ENGINEERING AT (888) 862-4185 IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN. ANY WORK PERFORMED BY THE CONTRACTOR AFTER THE FINDING OF SUCH DISCREPANCIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
2. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND/OR CURRENT WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL STANDARDS AND SPECIFICATIONS. SHOULD A CONFLICT BETWEEN THE DESIGN, SPECIFICATIONS, AND PLANS OCCUR, THE MOST STRINGENT REQUIREMENT WILL APPLY. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE DEVELOPER OR HIS AGENT OF THE RESPONSIBILITIES CONTAINED IN THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.
3. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE. ALSO, A REPRESENTATIVE OF THE DEVELOPER MUST BE AVAILABLE AT ALL TIMES.
4. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING MUD FROM TRUCKS AND/OR OTHER EQUIPMENT PRIOR TO ENTERING PUBLIC STREETS, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS, ALLEY DUST, AND TO TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT THE STREETS ARE MAINTAINED IN A CLEAN, MUD AND DUST FREE CONDITION AT ALL TIMES.
5. THE LOCATION OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE FROM FIELD LOCATIONS AND/OR GIS DATA. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES AS NEEDED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY CONFLICTS ARISING FROM HIS EXISTING UTILITY VERIFICATION AND THE PROPOSED CONSTRUCTION.
6. THE CONTRACTOR SHALL PROVIDE NOTIFICATION TO THE APPROPRIATE UTILITY COMPANY PRIOR TO CONSTRUCTION OF WATER AND/OR GAS PIPELINES. INFORMATION SHOULD ALSO BE OBTAINED FROM THE APPROPRIATE AUTHORITY CONCERNING PERMITS, CUT SHEETS, AND CONNECTIONS TO EXISTING LINES.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGES TO THE EXISTING STREETS AND UTILITIES WHICH OCCURS AS A RESULT OF HIS CONSTRUCTION PROJECT WITHIN OR CONTIGUOUS WITH THE EXISTING RIGHT-OF-WAY.
8. WHEN GRADING IS PROPOSED WITHIN EASEMENTS OF UTILITIES, LETTERS OF PERMISSION FROM ALL INVOLVED COMPANIES MUST BE OBTAINED PRIOR TO GRADING AND/OR SITE DEVELOPMENT.
9. THE DEVELOPER WILL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITIES WHICH IS REQUIRED AS A RESULT OF HIS PROJECT. THE RELOCATION SHOULD BE DONE PRIOR TO CONSTRUCTION.
10. THESE PLANS IDENTIFY THE LOCATION OF ALL KNOWN GRAVESITES. GRAVESITES SHOWN ON THIS PLAN WILL BE PROTECTED IN ACCORDANCE WITH STATE LAW. IN THE EVENT GRAVESITES ARE DISCOVERED DURING CONSTRUCTION, THE OWNER AND ENGINEER MUST BE NOTIFIED IMMEDIATELY.
11. THE CONTRACTOR(S) SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATING OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NOT MORE THAN TEN (10) WORKING DAYS, PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION.
12. CONTRACTOR TO CONTACT OPERATOR AND ENGINEER IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.
13. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE EROSION AND SEDIMENT CONTROL INSPECTOR 2 DAYS PRIOR TO THE START OF CONSTRUCTION.
14. THE CONTRACTOR IS RESPONSIBLE FOR ALL FILL MATERIAL PLACEMENT REQUIRED DURING THE CONSTRUCTION OF THIS PROJECT. ALL MATERIAL TESTS SHALL BE CONDUCTED BY THE ON-SITE INSPECTOR. ALL TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER CERTIFYING THE CONSTRUCTED FACILITY. FAILURE TO CONDUCT THE DENSITY TESTS AND/OR NECESSARY REPAIRS TO DEFICIENT AREAS AS A RESULT OF THE DENSITY TESTING SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE CONSTRUCTED FACILITY.
15. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING THE SITE IN ACCORDANCE WITH THE DESIGN PLANS AND CONSTRUCTION DOCUMENTS AND THE SCOPE OF WORK SHALL CONFORM WITH THE GRADES, BERMS, DEPTHS, DIMENSIONS, ETC. SHOWN HEREON.
16. SUPER SILT FENCE CAN BE USED IN PLACE OF ANY COMPOST FILTER SOCK.
17. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS, INCLUDING THE 1970 OSHA ACT. PRECAUTION FOR PROTECTION OF PERSONS, INCLUDING EMPLOYEES AND PROPERTY, SHALL ALWAYS BE EXERCISED BY THE CONTRACTOR. INITIATION, MAINTENANCE, AND SUPERVISION OF ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK, INCLUDING ALL REQUIREMENTS PER CFR 1910.146, SHALL ALSO BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. CONSTRUCTION ACTIVITIES SHALL BE RESTRICTED TO THE AREAS SHOWN ON THE PLANS WITHIN THE LIMITS OF DISTURBANCE, UNLESS OTHERWISE AUTHORIZED BY ANTERO RESOURCES CORPORATION. MODIFICATION PLAN MUST BE SUBMITTED TO THE DEP FOR ANY ACTIVITIES PERFORMED OUTSIDE OF THE LIMITS OF DISTURBANCE.
19. PRESERVATION OF BENCHMARKS, PROPERTY CORNERS, REFERENCE POINTS, STAKES AND OTHER SURVEY REFERENCE MONUMENTS OR MARKERS IS THE RESPONSIBILITY OF THE CONTRACTOR. IN CASES OF WILLFUL OR CARELESS DESTRUCTION THE CONTRACTOR SHALL BE REQUIRED TO REPLACE OR RESTORE SAID MONUMENT OR MARKER. RESETTling OF MARKERS SHALL BE PERFORMED BY A PROFESSIONAL SURVEYOR AS APPROVED BY ANTERO RESOURCES CORPORATION.
20. THE CONTRACTOR SHALL MAINTAIN ADEQUATE CLEARANCE FROM ALL ELECTRIC LINES, IF ANY, IN ACCORDANCE WITH NATIONAL ELECTRICAL SAFETY CODE.
21. THE CONTRACTOR SHALL MINIMIZE ALL CLEARING AND DISTURBANCE TO THE ENVIRONMENT TO THE MAXIMUM EXTENT POSSIBLE. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE.
22. ANY DIGITAL FILES PROVIDED TO THE CONTRACTOR BY NAVITUS ENGINEERING, INC. ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONSTRUCTION OF THE SITE SHALL MEET ALL DESIGN PARAMETERS OF THE WV DEP APPROVED NAVITUS ENGINEERING, INC. DESIGN PLANS. NAVITUS ENGINEERING, INC. WILL NOT BE HELD LIABLE FOR THE CONTRACTOR USING THE DIGITAL FILES TO WAIVER FROM THE APPROVED DESIGN PLANS.
23. ANY CONSTRUCTION ISSUES OR QUESTIONS SHALL BE BROUGHT TO THE ENGINEER IMMEDIATELY. THE CONSTRUCTION INSPECTOR SHALL BE CONTACTED AND MUST RELAY THESE ISSUES OR QUESTIONS TO THE ENGINEER FOR RESOLUTION. TEMPORARY STABILIZATION SHALL BE APPLIED AS NECESSARY.
24. ALL EXISTING AND DESIGNED CULVERTS AND CULVERT SUMPS SHALL BE CLEANED AND CLEARED OF DEBRIS DURING THE COURSE OF CONSTRUCTION. ANY EXCESS EROSION DUE TO THE PLUGGING OF A CULVERT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

EROSION AND SEDIMENT CONTROL NARRATIVE:

PROJECT DESCRIPTION: THE PURPOSE OF THIS PROJECT IS TO CONSTRUCT A GAS WELL PLUGGING PAD AND TO AID IN THE PLUGGING OF AN EXISTING INDIVIDUAL GAS WELL. THE ACCESS ROAD ENTRANCE TO THE PROPOSED SITE IS LOCATED ON THE EAST SIDE OF WV RT. 50/32, 0.20 MILES SOUTH OF THE INTERSECTION OF INTERSTATE 50 AND CO. RT. 50/32 IN DODDRIDGE COUNTY, WEST VIRGINIA. THE TOTAL APPROXIMATE LAND DISTURBANCE ASSOCIATED WITH THIS PROJECT IS 6.08 ACRES.

EXISTING SITE CONDITIONS: THE EXISTING SITE IS APPROXIMATELY 88.5% WOODED. THE TOPOGRAPHY RANGES FROM MODERATE TO STEEP TERRAIN (2% TO 33% SLOPES). PRESENT ON SITE ARE ACCESS ROADS, OVERHEAD UTILITIES, EXISTING STRUCTURES, AN EXISTING GAS WELL, AND TANKS ASSOCIATED WITH THE EXISTING GAS WELL. 3 INTERMITTENT STREAM(S), AND 1 EPHEMERAL STREAM(S) ARE LOCATED ONSITE. THE SITE IS LOCATED ON A RIDGE AND DRAINS TO CABIN RUN AND TRIBUTARIES OF CABIN RUN. NO EROSION WAS NOTICED ON SITE.

ADJACENT PROPERTY: THE SITE IS BORDERED BY FORESTED LANDS ON THE EAST AND SOUTH, LANDFILL TO THE WEST AND NORTH.

CRITICAL AREAS: THE AREA(S) SHOWN ALONG THE FIELD DELINEATED STREAMS, WETLANDS, AND PONDS, AS SHOWN ON THE PLANS, ARE DESIGNATED AS CRITICAL AREA(S), IF PRESENT. ALL 3:1 SLOPES AND STEEPER DITCHES, AND OTHER CONTROLS SHALL BE CONSIDERED CRITICAL EROSION AREAS. THESE AREAS SHALL BE MONITORED AND MAINTAINED DAILY DURING CONSTRUCTION AND AFTER EACH RAINFALL OF 0.5 INCHES OR GREATER. COMPOST FILTER SOCKS ARE TO BE USED TO PROTECT THESE FIELD DELINEATED AREA(S) FROM SEDIMENT LEAVING THE SITE. ADDITIONALLY, ORANGE SAFETY FENCE IS RECOMMENDED TO BE INSTALLED ABOVE/AROUND THESE AREA(S), TO SERVE AS A PHYSICAL BARRIER, ENSURING THE AREA(S) ARE NOT DISTURBED. THE LOCAL GOVERNING AUTHORITY WILL HAVE THE AUTHORITY TO RECOMMEND THE PLACEMENT OF ADDITIONAL EROSION CONTROL MEASURES IN THESE AREAS IF IT BECOMES EVIDENT DURING CONSTRUCTION THAT THE ONES IN PLACE ARE NOT FUNCTIONING SUFFICIENTLY.

SOILS: NO SOIL STUDIES OR SUBSURFACE INVESTIGATIONS WERE PERFORMED AND ANALYZED FOR THE DESIGN OF THIS SITE.

OFF SITE AREAS: THERE ARE NO BORROW AREA(S) OR EXPORT STOCKPILE AREA(S) OUTSIDE OF THE PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT.

EROSION AND SEDIMENT CONTROL MEASURES: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

STRUCTURAL PRACTICES:

1. INSTALL ORANGE SAFETY FENCE TO ENSURE NO DISTURBANCE TO THE DELINEATED AREA(S).
2. INSTALL TEMPORARY CONSTRUCTION ENTRANCE.
3. INSTALL COMPOST FILTER SOCKS AND/OR SILT FENCE AS SHOWN ON THE PLANS TO REMOVE SEDIMENT FROM RUNOFF. SELECTIVELY REMOVE TREES REQUIRED TO INSTALL COMPOST FILTER SOCK IN WOODED AREAS. CLEARING AND GRUBBING SHALL BE KEPT AT A MINIMUM TO INSTALL E&S CONTROLS.
4. FILL SLOPE SURFACE SHALL BE LEFT IN A ROUGHENED CONDITION TO REDUCE EROSION. CONTRACTOR SHALL REDIRECT RUNOFF AWAY FROM THE FILL SLOPE BY INSTALLING EARTHEN DIVERSION BERMS AND DIVERTING THE RUNOFF TO SEDIMENT TRAPPING DEVICES.
5. INSTALL V-DITCHES, DITCH RELIEF CULVERTS, AND OUTLET PROTECTION (RIP-RAP APRONS) AS SHOWN ON THE PLANS.

DEVICES LISTED ABOVE ARE CONSIDERED MINIMUM EROSION AND SEDIMENT CONTROLS. ADDITIONAL CONTROL MEASURES MAY BE NECESSARY DUE TO CONTRACTOR PHASING OR OTHER UNFORESEEN CONDITIONS. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BMP'S TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION. ALL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL. ALL RUNOFF FROM DISTURBED AREAS SHALL PASS THROUGH A SEDIMENT FILTERING DEVICE LOCATED BELOW THE DISTURBED AREA. AT NO TIME WILL UNFILTERED SEDIMENT LADEN RUNOFF BE ALLOWED TO LEAVE THE SITE AND ENTER STATE WATERS.

PERMANENT STABILIZATION: ALL AREAS LEFT UNCOVERED BY EITHER BUILDINGS OR PAVEMENT SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING AND WITHIN SEVEN (7) DAYS. AT NO TIME SHALL LAND LAY DORMANT LONGER THAN TWENTY-ONE (21) DAYS.

MAINTENANCE PROGRAM: DURING CONSTRUCTION ACTIVITIES, ALL CONTROL MEASURES SHALL BE INSPECTED DAILY BY THE SITE SUPERINTENDENT OR HIS REPRESENTATIVE AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY SIGNIFICANT RAIN EVENT, WHICH SHALL BE DEFINED AS RAINFALL OF TWO (2) INCHES OR MORE IN A SIX (6) HOUR PERIOD. ONCE CONSTRUCTION ACTIVITIES HAVE CONCLUDED, THE SITE SHALL BE INSPECTED EVERY TWO (2) WEEKS FOR THE LIFE OF THE FACILITY AND WITHIN TWENTY-FOUR (24) HOURS OF A SIGNIFICANT RAIN EVENT AS DEFINED ABOVE. ANY DAMAGED STRUCTURAL MEASURES ARE TO BE REPAIRED, BY THE END OF THE DAY, OR AT THE EARLIEST TIME IN WHICH IT IS SAFE TO DO SO. SEEDED AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND OF GRASS IS MAINTAINED. ALL AREAS SHALL BE FERTILIZED AND RESEEDED AS NEEDED UNTIL GRASS IS ESTABLISHED.

TRAPPED SEDIMENT IS TO BE REMOVED AS REQUIRED TO MAINTAIN 50% TRAP AND/OR SOCK EFFICIENCY AND DISPOSED OF AS ENGINEERED FILL ON THE STOCKPILES.

INLETS AND OUTLETS OF DITCH RELIEF CULVERTS SHALL BE CHECKED REGULARLY FOR SEDIMENT BUILD-UP. IF THE INLET AND/OR OUTLET IS CLOGGED BY 50% OR GREATER, IT SHALL BE REMOVED AND CLEANED OR REPLACED IMMEDIATELY.

SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED OR SWEEPED INTO ANY ROADSIDE DITCH, CULVERT OR SURFACE WATER.

ANY DISTURBED AREAS ALONG THE ACCESS ROAD SHALL BE STABILIZED AS CONSTRUCTION PROCEEDS, PRIOR TO CONTINUING FURTHER ACCESS ROAD CONSTRUCTION, WITH EITHER ROCK STABILIZATION OR SEEDING AND MULCHING METHODS.

NOTE: THE WV DEP RETAINS THE RIGHT TO ADD AND/OR MODIFY THESE EROSION AND SEDIMENT CONTROL MEASURES DURING THE CONSTRUCTION PROCESS, WITHIN REASON, TO ENSURE ADEQUATE PROTECTION TO THE PUBLIC AND THE ENVIRONMENT.

SEEDING (SOIL STABILIZATION):

1. CONTRACTOR SHALL APPLY SEED AND STABILIZATION IN ACCORDANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL, BASED UPON SITE SPECIFIC SOIL CHARACTERISTICS.
2. WHEREVER SEEDING IS TO BE APPLIED TO STEEP SLOPES (\geq 3H:1V), SEED MIXTURES SHOULD BE SELECTED THAT ARE APPROPRIATE FOR STEEP SLOPES.

DUST CONTROL:

1. TEMPORARY SEEDING SHALL BE APPLIED TO ALL DISTURBED AREAS SUBJECT TO LITTLE OR NO CONSTRUCTION TRAFFIC.
2. ALL HAUL ROADS AND OTHER HEAVY TRAFFIC ROUTES SHALL BE SPRINKLED WITH WATER UNTIL THE SURFACE IS WET AND REPEATED AS NEEDED TO CONTROL DUST.

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CONTROL NOTES

CONSTRUCTION SEQUENCE:

DEVELOPMENT OF THIS SITE SHALL BE CONSISTENT WITH THE FOLLOWING GENERAL ORDER OF CONSTRUCTION. THE CONTRACTOR SHALL IMPLEMENT, MAINTAIN, AND OPERATE ALL EROSION AND SEDIMENT CONTROL MEASURES TO EFFECTIVELY MITIGATE THE HAZARD OF ACCELERATED EROSION AND SEDIMENTATION TO ACCEPTABLE LEVELS. MINOR DEVIATIONS FROM THIS SEQUENCE SHALL BE EXECUTED BY THE PROJECT'S SUPERINTENDENT AS NEEDED TO CORRECT ANY POTENTIAL EROSION CONDITION THAT MAY ARISE FOR THE DURATION OF THE PROJECT. THE WV DEP OFFICE OF OIL AND GAS SHALL BE NOTIFIED OF ANY AND ALL SUCH DEVIATIONS FROM THE APPROVED PLANS.

BEFORE CONSTRUCTION COMMENCEMENT WITH THE CONTRACTOR AND THE APPROPRIATE EROSION AND SEDIMENT CONTROL INSPECTOR 48 HOURS PRIOR TO BEGINNING WORK TO REVIEW THE CONSTRUCTION DRAWINGS AND PROVIDE ANY REQUESTED GUIDANCE.

RESPECT THE LIMITS OF CONSTRUCTION AND MARK/FLAG ALL IDENTIFIED WETLANDS, STREAMS, UTILITIES, AND OTHER AREAS OF CONCERN FOR CONSTRUCTION ACTIVITIES. INSTALL SIGNS TO IDENTIFY THE AREAS AND ORANGE SAFETY FENCE TO IDENTIFY IMPORTANT PROJECT FEATURES SUCH AS APPROVED ACCESS ROADS, NO REFUELING ZONES, WETLANDS/STREAM CHANNELS, ETC.

CONSTRUCT THE ROCK CONSTRUCTION ENTRANCE. ALL VEHICLES ENTERING AND EXITING THE SITE SHALL DO SO VIA THE ROCK CONSTRUCTION ENTRANCE.

STRUCTURE ALL BMP'S AS SOON AS CLEARING AND GRUBBING OPERATIONS ALLOW. ONCE ALLOWED, THE AREA ENCLOSING THE BMP'S OUTSIDE OF THE GRADING LIMITS SHALL BE DEMARCAED AND MULCHED IMMEDIATELY.

IF APPLICABLE, CONVEY UP-SLOPE DRAINAGE AROUND THE ACCESS ROAD AND WELL PAD AREAS BY CONSTRUCTING ALL DIVERSION BERM(S) AND/OR COMPOST FILTER SOCK DIVERSION(S) AS SHOWN ON THE PLANS.

PREPARE AND GRUB THE SITE. ALL WOODY MATERIAL, BRUSH, TREES, STUMPS, LARGE ROOTS, LOGS, AND DEBRIS SHALL BE CLEARED FROM THE SITE AREA AND KEPT TO THE MINIMUM NECESSARY FOR PROPER CONSTRUCTION, INCLUDING THE INSTALLATION OF NECESSARY EROSION CONTROL MEASURES. TREES SIX INCHES IN DIAMETER AND LARGER SHALL BE CUT AND LOGS SKIDED. SMALLER TREES, BRUSH, AND STUMPS SHALL BE CUT AND/OR CRUSHED AND SPREAD IN APPROPRIATE AREAS FOR USE AS SEDIMENT BARRIERS AT WATER DRAINAGE DIVERSIONS (AS SHOWN ON THE PLANS), WINDOWED BELOW THE WELL SITE, USED FOR WILDLIFE HABITAT, BURNED (AS PER WV FOREST FIRE LAWS), REMOVED FROM SITE, OR DISPOSED OF BY OTHER METHODS APPROVED BY WV DEP.

IF APPLICABLE, INSTALL ALL WETLAND OR STREAM CROSSINGS AS SHOWN ON THE PLANS.

STRIP THE TOPSOIL FROM THE ACCESS ROAD. TOPSOIL STRIPPING SHALL BE KEPT TO A MINIMUM NECESSARY TO CONSTRUCT ACCESS ROAD PRIOR TO PLACING ANY FILL. THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNWEAVING SITE. ALL STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS, OR RE-SPREAD AT AN APPROXIMATE DEPTH OF 2-4 INCHES ON ALL PROPOSED 2:1 OR FLATTER SLOPES, AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.

CONSTRUCT THE ACCESS ROAD. ALL FILL AREAS, INCLUDING EXCESS MATERIAL STOCKPILES, SHALL BE KEYED IN AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED IN THE GEOTECHNICAL REPORT. FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 90% PER THE STANDARD PROCTOR TEST (ASTM-D698). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS. IT IS ALSO RECOMMENDED THAT EACH LIFT BE PROOF ROLLED WITH A LOADED HAUL TRUCK WHERE PRACTICABLE. DITCH RELIEF CULVERTS SHALL BE INSTALLED AT A GRADE OF 1-2% TO SIZE OUTLET VEGETABLES TO THE EXTENT POSSIBLE. INSTALL OUTLET PROTECTION ONCE ALL RELIEF CULVERTS ARE INSTALLED, AS SHOWN ON PLANS. STABILIZE THE ROAD WITH GEOTEXTILE FABRIC & STONE AND SIDE SLOPES AS SPECIFIED WITH PERMANENT SEEDING. EXCESS MATERIAL SHALL BE STOCKPILED (IF NECESSARY) IN AREAS SHOWN IN THE PLANS IMMEDIATELY STABILIZED. TOPSOIL SHALL BE STRIPPED FROM ALL STOCKPILE AREAS PRIOR TO CONSTRUCTION OF STOCKPILES. AFTER STOCKPILES ARE CONSTRUCTED, TOPSOIL IS TO BE REAPPLIED AT A DEPTH OF 2"-4" SLOPES SHALL BE TRACKED BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. DITCH LINES SHALL BE CLEARED PRIOR TO INSTALLATION OF LIMED PROTECTION.

STRIP THE TOPSOIL FROM THE WELL PAD. TOPSOIL STRIPPING SHALL BE KEPT TO A MINIMUM NECESSARY TO CONSTRUCT WELL PAD PRIOR TO PLACING ANY FILL. THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNWEAVING SITE. STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS, OR RE-SPREAD AT AN APPROXIMATE DEPTH OF 2-4 INCHES ON ALL PROPOSED 2:1 OR FLATTER SLOPES, AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.

PREPARE THE WELL PAD AREA AS SHOWN ON THE PLANS. INSTALL PAD PUMPS (WITH 4" PVC IN PIPE AND OUTLET PROTECTION) AND CONTAINMENT BERM LINER SYSTEM IMMEDIATELY WITHIN THE OUTER AREAS OF THE WELL PAD. THE WELL PAD AREA SHALL BE STABILIZED WITH GEOTEXTILE FABRIC & STONE AND THE SIDE SLOPES WITH SEED AND MULCH. INSTALL STRAW WATTLES AS SHOWN ON PLANS. APPLY SEED AND MULCH TO ALL DISTURBED AREAS. THIS SHALL INCLUDE ALL AREAS THAT WILL NOT BE SUBJECT TO REGULAR TRAFFIC (TO BE STABILIZED WITH STONE), OR ANY DISTURBED AREA THAT WILL NOT BE STABILIZED BEFORE SITE RECLAMATION BEGINS.

PREPARE WELL DRILLING ACTIVITY.

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 ACCORDANCE WITH 26.2-2-1 AND ON A BIWEEKLY BASIS.

CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER FINISHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 50% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY A 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 DISTURBED AREA.

PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WV DEP.

AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDDED.

CONSTRUCTION STANDARDS:

THE DESIGN, CONSTRUCTION, AND REMOVAL OF FILL FOR OIL AND GAS SITES MUST BE ACCOMPLISHED IN SUCH A MANNER AS TO PROTECT THE HEALTH AND SAFETY OF THE PEOPLE, THE NATURAL RESOURCES, AND ENVIRONMENT OF THE STATE. THE SITE SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO BE STRUCTURALLY SOUND AND REASONABLY PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES.

1. ALL FILL AREAS SHOULD BE CLEARED OF TREES, STUMPS, AND ANY VEGETATION AND STRIPPED OF TOPSOIL/ORGANIC SOILS PRIOR TO THE START OF FILL PLACEMENT.
2. ANY GROUNDWATER ENCOUNTERED DURING CONSTRUCTION SHALL BE DRAINED TO THE OUTSIDE/DOWNSTREAM TOE OF THE SLOPE. CONSTRUCTED DRAIN SECTION SHALL BE AN EXCAVATED 2' x 2' TRENCH AND BACK FILLED WITH #57 STONE, COMPACTED 5' HAND TAMPER. GEOTEXTILE FABRIC SHALL BE USED TO LINE TRENCH.
3. SATISFACTORY MATERIALS FOR USE AS FILL FOR PAD AREAS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2489 AS GW, GP, GM, GC, SW, SP, SM, SC, ML, AND CL GROUPS.
4. GENERALLY, UNSATISFACTORY MATERIALS INCLUDING MATERIALS CLASSIFIED IN ASTM D-2489 AS PT, CH, MH, OH, DH, AND ANY SOIL TOO WET TO FACILITATE CONSTRUCTION OF CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE ENGINEER.
5. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED IN THE GEOTECHNICAL REPORT. ALL FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 90% PER THE STANDARD PROCTOR TEST (ASTM-D698) MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.
6. ROCK LIFTS ARE NOT PROPOSED FOR THE CONSTRUCTION OF THIS SITE. HOWEVER, LARGER ROCK PARTICLES OR BOULDERS THAT ARE ENCOUNTERED DURING CONSTRUCTION NEED TO BE BROKEN DOWN TO A MANAGEABLE SIZE (MAXIMUM 3"x3" THICK) TO BE PLACED AS FILL DURING PLACEMENT OF FILL CONTAINING LARGE SIZE ROCK PARTICLES. IT IS CRITICAL THAT NO VOID SPACES BE LEFT BETWEEN THE ROCKS. SMALLER ROCK FRAGMENTS AND SOIL MUST BE WORKED INTO ANY OPENINGS BETWEEN THE BOULDERS AFTER THEY ARE PUT IN PLACE. ADDITIONAL GUIDANCE REGARDING ENCOUNTERED ROCK CAN BE FOUND IN THE GEOTECHNICAL REPORT.
7. THE PLACEMENT OF ALL FILL MATERIAL SHALL BE FREE OF WOOD, STUMPS AND ROOTS, LARGE ROCKS AND BOULDERS, AND ANY OTHER NON-COMPACTABLE SOIL MATERIAL. NO FILL SHALL CONTAIN OR BE PLACED ON FROZEN MATERIAL. THE FILL SHALL BE COMPACTED TO A MINIMUM OF VISIBLE NON-MOVEMENT; HOWEVER, THE COMPACTION EFFORT SHALL NOT EXCEED THE OPTIMUM MOISTURE LIMITS.
8. ALL EXPOSED AREAS, NOT COVERED BY COMPACTED GRAVEL OR RIP-RAP SHALL BE LIMED, FERTILIZED, SEEDED AND MULCHED. PERMANENT VEGETATIVE GROUND COVER IN COMPLIANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL FIELD MANUAL MUST BE ESTABLISHED UPON THE COMPLETION OF CONSTRUCTION. SLOPES SHALL BE MAINTAINED WITH A GRASSY VEGETATIVE COVER AND FREE OF BRUSH AND/OR TREES.
9. IF STANDING WATER IS PRESENT ON SITE, CONTRACTOR TO CORRECT DRAINAGE ISSUE BY DIRECTING WATER TO PROPER E&S CONTROLS OR OUTLET WITH POSITIVE DRAINAGE. IF NECESSARY, CONTACT ENGINEER FOR GUIDANCE IN CORRECTING DRAINAGE ISSUES.
10. ALL DRAINAGE DITCHES, DIVERSIONS, AND CULVERTS SHALL HAVE POSITIVE DRAINAGE AND OUTFALL INTO THE PROPER OUTLET PROTECTION OR LEVEL SPREADING DEVICE. SUPER SILT FENCE, OR APPROVED ALTERNATIVE, SHALL BE INSTALLED WITHIN 5 FEET OF THE OUTLET PROTECTION OR LEVEL SPREADING DEVICE TO PREVENT EROSION DOWNSTREAM. IF EROSION IS PRESENT UPSTREAM OF AN EROSION CONTROL DEVICE, CONTRACTOR TO INSTALL ADDITIONAL EROSION CONTROLS AND STABILIZATION TO PREVENT FURTHER EROSION.
11. ALL DRAINAGE DITCHES AND DIVERSIONS THAT ARE ROCK LINED SHALL BE INSTALLED PER THE DETAILS ON THIS PLAN INCLUDING THE NECESSARY INSTALLATION OF ANY GEOTEXTILE FABRIC UNDERNEATH THE ROCK LINING.
12. IF THE EROSION CONTROL DEVICES SHOW EVIDENCE OF BEING INADEQUATE DUE TO CONSTRUCTION MEANS AND METHODS, THE CONTRACTOR IS TO INSTALL ADDITIONAL DRAINAGE DEVICES OR EROSION CONTROLS TO PREVENT FURTHER EROSION FROM OCCURRING.
13. CONTRACTOR IS TO EXTEND ALL KEYWAY AND PONDING BENCH OUTLET DRAINS A MINIMUM OF ONE FOOT EAST OF THE FINISHED GRADE OF THE SLOPE AND INSTALL THE PROPER OUTLET PROTECTION PER THE DETAIL ON THESE PLANS. ALL OUTLET DRAINS ARE TO BE CLEARLY VISIBLE AND MARKED.
14. ALL SLOPES SHALL BE TRACKED IN PER THE DETAILS ON THESE PLANS. CONTRACTOR SHALL REPEAT THIS METHOD ANY TIME AN AREA HAS BEEN DISTURBED PRIOR TO THAT AREA BEING STABILIZED.
15. ALL MAINTENANCE OF EROSION AND SEDIMENT CONTROLS MUST BE PERFORMED IMMEDIATELY ONCE THE CONTRACTOR IS NOTIFIED OF THE DISCREPANCY. CONTRACTOR TO PERFORM MAINTENANCE OR IMMEDIATELY NOTIFY THE SUB-CONTRACTOR PERFORMING THE E&S TASKS. ANY EROSION CONTROL MAINTENANCE THAT IS DEEMED TO BE AN EMERGENCY SHALL BE PERFORMED IMMEDIATELY UPON THE CLIENT, ENGINEER, OR STATE'S REQUEST.
16. ALL LANDOWNER ACCESS ROADS AND EXISTING WELL ROADS THAT ARE BEING MAINTAINED SHALL BE KEPT OPEN DURING THE ENTIRE COURSE OF CONSTRUCTION TO PROVIDE CONTINUOUS ACCESS. IF CLOSURE IS NECESSARY, THE CONTRACTOR SHALL PROVIDE AN EQUIVALENT DETOUR ROUTE TO THE SATISFACTION OF THE LANDOWNER OR WELL OWNER.
17. ANY WATER INFILTRATING AROUND THE WELL PAD DOWNSIDE SYSTEM SHALL BE CORRECTED IMMEDIATELY TO PREVENT THE FAILURE OF THE SOILS AND DESIGN ASPECTS OF THE DOWNSIDE SYSTEM. ANY EXCESS EROSION OR SLOPE FAILURES DUE TO THE WATER INFILTRATION IN THE SUMP AREA SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL DITCH RELIEF AND STREAM CROSSING CULVERTS SHALL MEET ALL MANUFACTURER SPECIFICATIONS INCLUDING THE MINIMUM AND MAXIMUM COVER. IF MANUFACTURER SPECIFICATIONS CANNOT BE MET, CONTRACTOR SHALL CONSULT THE ENGINEER OR MANUFACTURER FOR ALTERNATIVES.

SITE CLEANUP & RECYCLE PROGRAM:

1. GARBAGE, FUELS OR ANY SUBSTANCE HARMFUL TO HUMAN, AQUATIC OR FISH LIFE, WILL BE PREVENTED FROM ENTERING SPRINGS, STREAMS, PONDS, LAKES, WETLANDS OR ANY WATER COURSE OR WATER BODY.
2. OILS, FUELS, LUBRICANTS AND COOLANTS WILL BE PLACED IN SUITABLE CONTAINERS AND DISPOSED PROPERLY.
3. ALL TRASH AND GARBAGE WILL BE COLLECTED AND DISPOSED PROPERLY.
4. ALL SEDIMENT REMOVED FROM SEDIMENT CAPTURING DEVICES SHALL BE PLACED ON THE TOPSOIL STOCKPILE, THEN SEEDED AND MULCHED, AS NECESSARY. ALTERNATIVELY, THE REMOVED SEDIMENT CAN BE TRANSPORTED TO A SITE WITH AN APPROVED PERMIT.
5. ALL POLLUTION AND EMERGENCY SPILLS SHALL BE IMMEDIATELY REPORTED TO ANTERO RESOURCES CORPORATION AND THE WV DEP OFFICE OF OIL AND GAS. (EMERGENCY #1-800-642-3074).



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REVISION	DATE



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CONSTRUCTION AND E&S CONTROL NOTES
API#47-017-03069
 WELL #1
 CENTRAL DISTRICT
 DODDRIIDGE COUNTY, WEST VIRGINIA

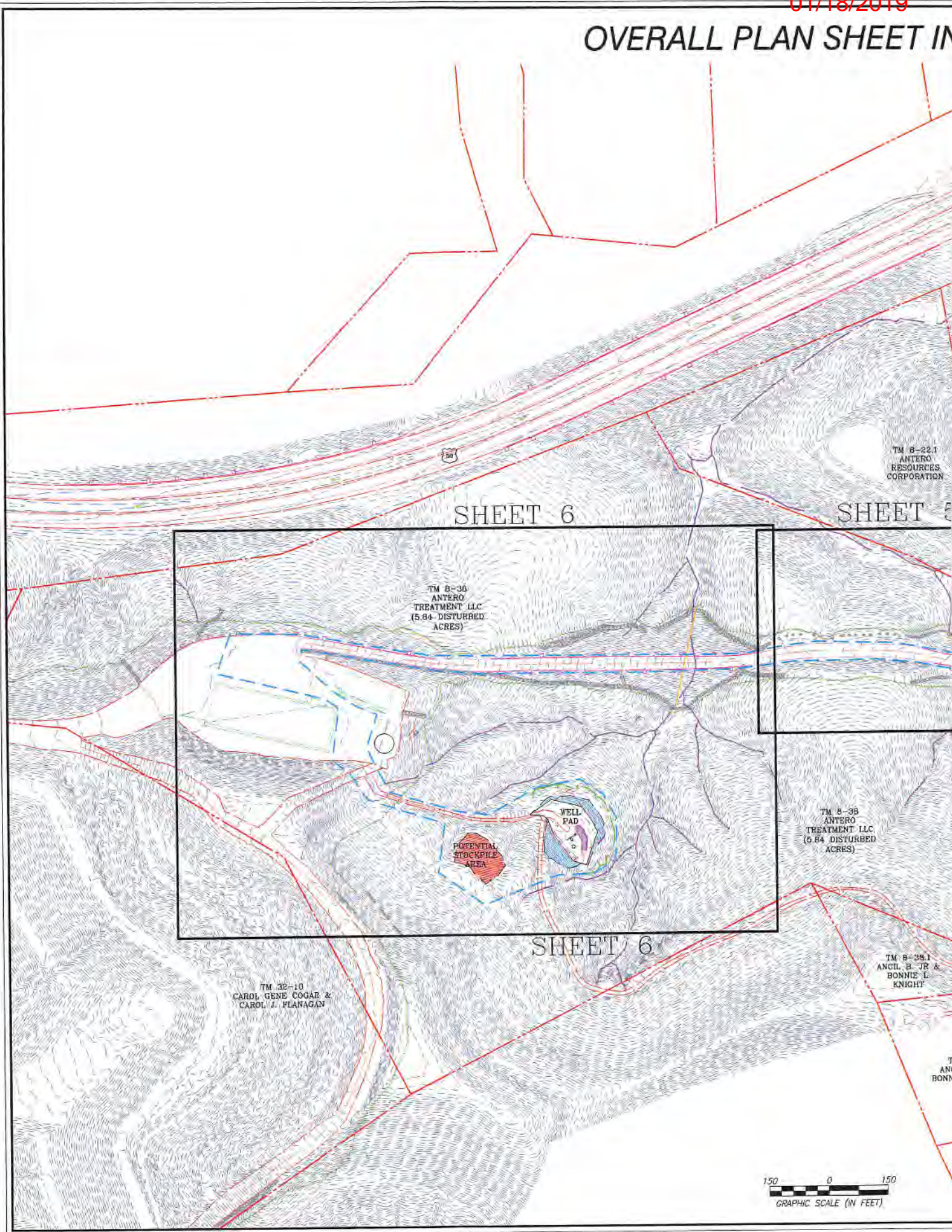


DATE: 10/19/2018
 SCALE: N/A
 SHEET 2 OF 7

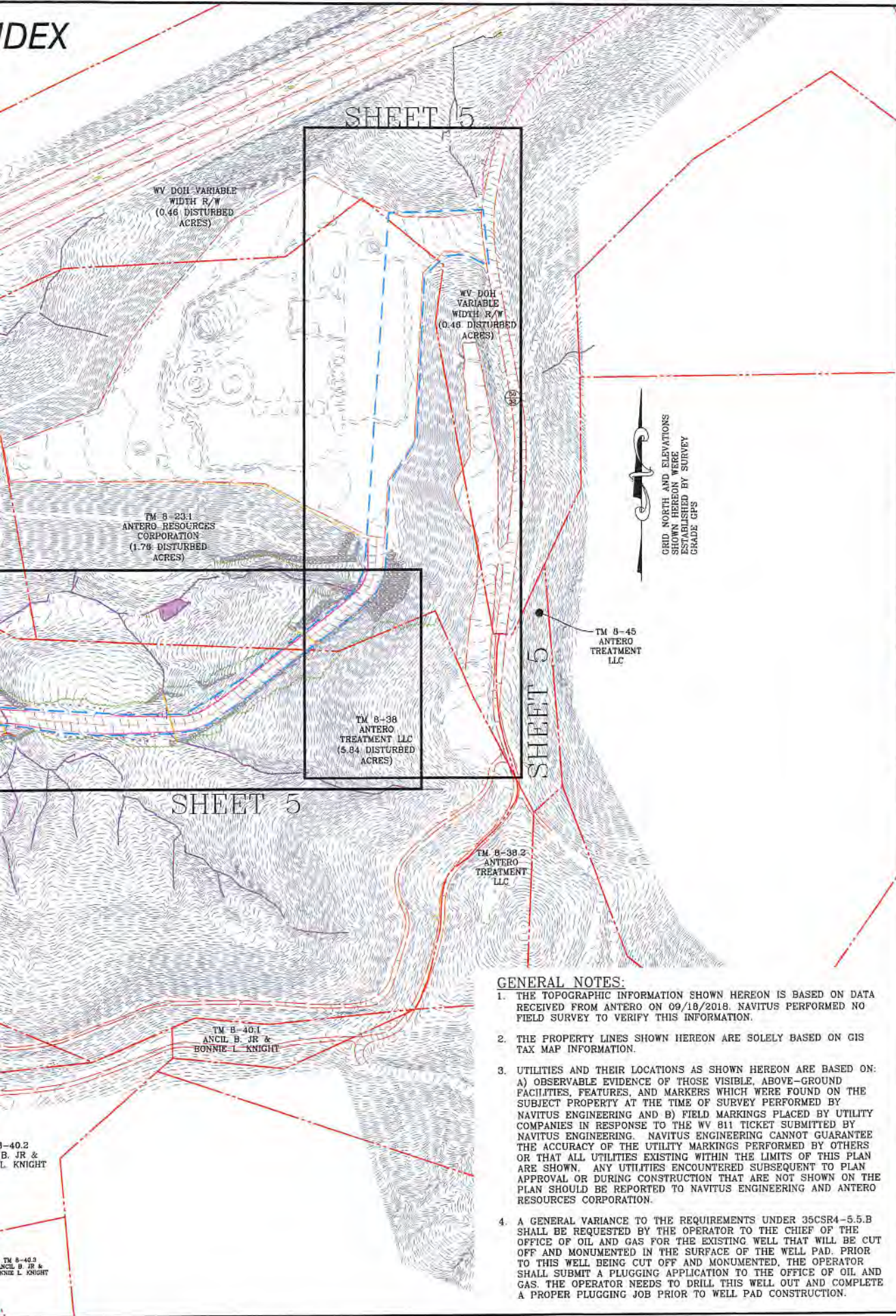
LEGEND

LEGEND		
EX. INDEX CONTOUR & CONTOUR LABEL		PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR		PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE		PR. INTERMEDIATE CONTOUR
EX. EDGE OF GRAVEL/DIRT		PR. INDEX ROAD
EX. EDGE OF PAVEMENT		PR. INTERMEDIATE CONTOUR
EX. ROAD CENTERLINE		PR. PADS/STOCKPILES
EX. EDGE OF CONCRETE		PR. LIMITS OF PROJECT
EX. GUARDRAIL		PR. ROAD/IMPROVEMENT
EX. BRIDGE		PR. ROAD CENTERLINE
EX. DITCHLINE/DRAINAGE FEATURE		PR. GUARDRAIL
EX. RIP-RAP		PR. ROCK CONSTRUCTION
EX. CULVERT		PR. AIR BRIDGE
EX. TREELINE		PR. CULVERT
EX. BUILDING		PR. DITCH
EX. MISCELLANEOUS FEATURE		PR. RIP-RAP
EX. 100-YR FEMA FLOODPLAIN		PR. OUTLET PIPE
EX. DELINEATED STREAM		PR. DIVERSION
EX. DELINEATED WETLAND/POND		PR. ROCK FILTER
100' WETLAND/STREAM BUFFER		PR. COMPOST
STREAM/WETLAND DELINEATION STUDY AREA		PR. SMART FENCE
EX. FENCELINE/PERIMETER SAFETY FENCE		PR. SMART FENCE
EX. GATE		PR. STRAW WATTLE
EX. ACCESS GATE WITH EMERGENCY LIFELINE		PR. WELL HEAD
EX. WELL HEAD ON DESIGNED PAD		PR. PAD DEWATERING
EX. GAS WELL		PR. TOP OF PAVEMENT
EX. PIPELINE		PR. SPOT SHOWN
EX. PIPELINE R/W		PR. PERIMETER
EX. PIPELINE METER		PR. ACCESS GATE
EX. PIPELINE VALVE		PR. PIPELINE
EX. PIT		PR. PIPELINE
EX. POWER POLE/GUY WIRE		PR. OVERHEAD
EX. OVERHEAD UTILITY		PR. POWER POLE
EX. UNDERGROUND ELECTRIC		PR. OVERHEAD
EX. UNDERGROUND TELEPHONE		PR. TELEPHONE
EX. UNDERGROUND FIBER OPTIC		PR. WATERLINE
EX. UTILITY R/W		PR. RIGHT-OF-WAY
EX. WATERLINE		PR. PERMANENT
EX. SANITARY LINE		PR. TEMPORARY
EX. WATER WELL/EX. SPRING		BORING LOCATION
EX. COMPOST SOCK		X-SECTION/PROPOSED
EX. SUPER SILT FENCE		X-SECTION/PROPOSED
EX. SILT FENCE		X-SECTION/PROPOSED
EX. STRAW WATTLE		X-SECTION/PROPOSED
EX. RIGHT-OF-WAY		X-SECTION/PROPOSED
MATCHLINE		X-SECTION/PROPOSED

OVERALL PLAN SHEET IN



INDEX



NAVITUS
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REVISION	DATE

THIS DOCUMENT WAS PREPARED FOR:
ANTERO RESOURCES CORPORATION

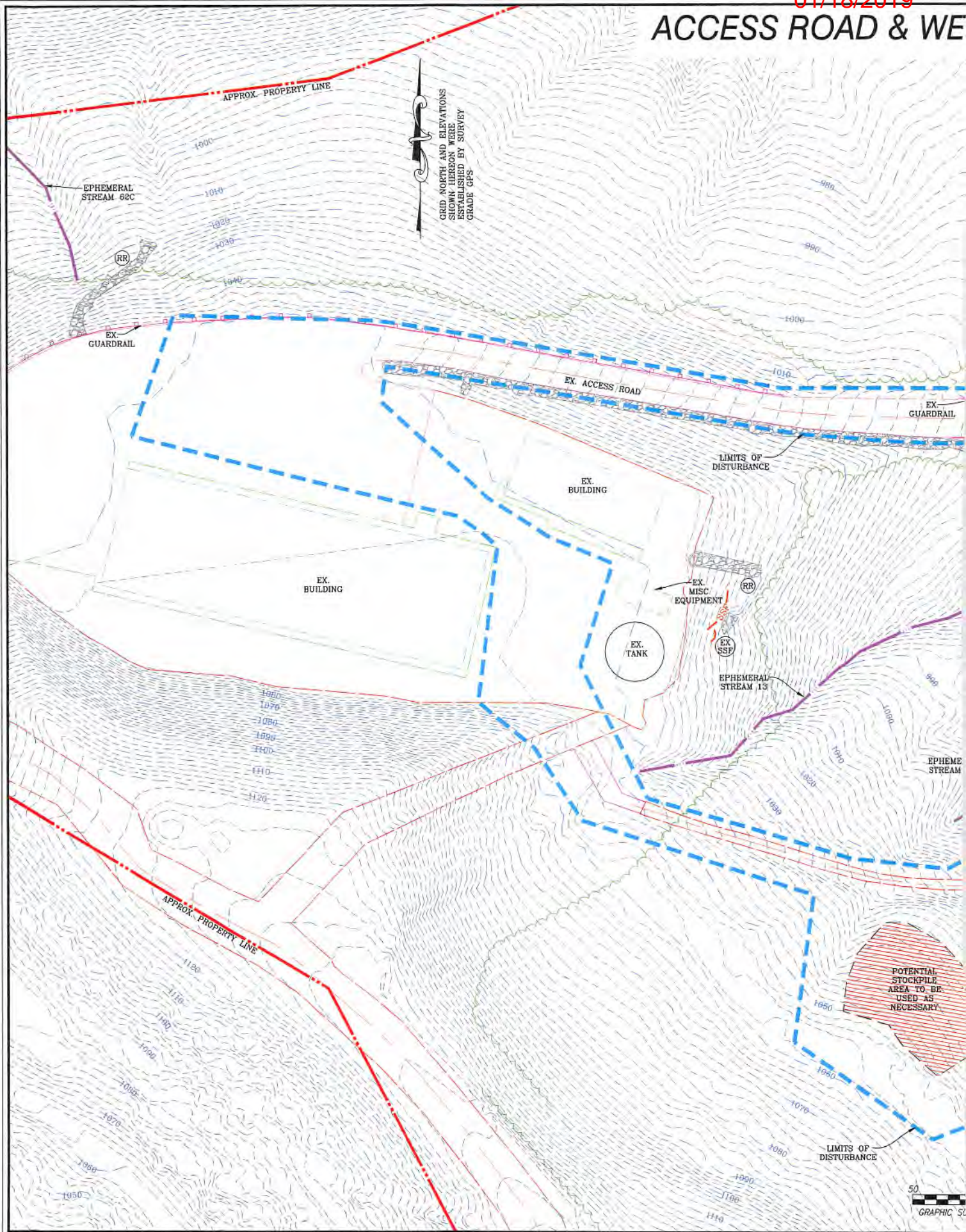
OVERALL PLAN SHEET INDEX
API#47-017-03069
WELL #1
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

DATE: 10/19/2018
SCALE: 1" = 150'
SHEET 4 OF 7

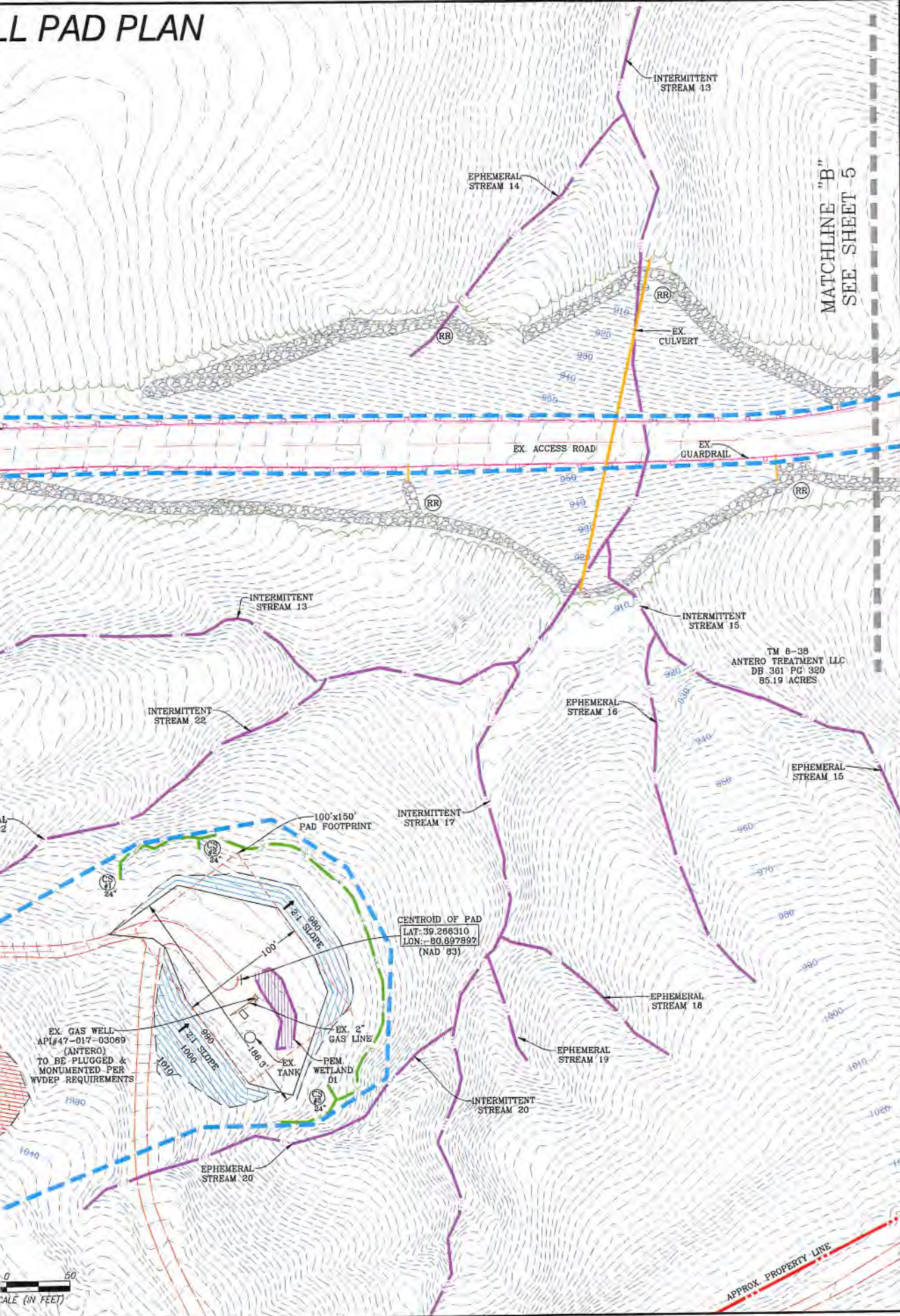
GENERAL NOTES:

1. THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON DATA RECEIVED FROM ANTERO ON 09/18/2018. NAVITUS PERFORMED NO FIELD SURVEY TO VERIFY THIS INFORMATION.
2. THE PROPERTY LINES SHOWN HEREON ARE SOLELY BASED ON GIS TAX MAP INFORMATION.
3. 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.
4. A GENERAL VARIANCE TO THE REQUIREMENTS UNDER 35CSR4-5.5.B SHALL BE REQUESTED BY THE OPERATOR TO THE CHIEF OF THE OFFICE OF OIL AND GAS FOR THE EXISTING WELL THAT WILL BE CUT OFF AND MONUMENTED IN THE SURFACE OF THE WELL PAD. PRIOR TO THIS WELL BEING CUT OFF AND MONUMENTED, THE OPERATOR SHALL SUBMIT A PLUGGING APPLICATION TO THE OFFICE OF OIL AND GAS. THE OPERATOR NEEDS TO DRILL THIS WELL OUT AND COMPLETE A PROPER PLUGGING JOB PRIOR TO WELL PAD CONSTRUCTION.

ACCESS ROAD & WE



WELL PAD PLAN



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ACCESS ROAD & WELL PAD PLAN
API#47-017-03069
WELL #1
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA



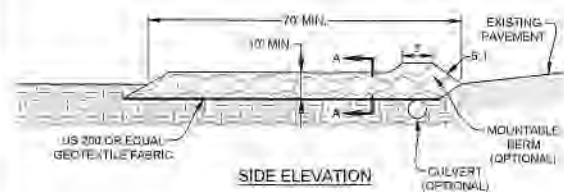
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SHEET 6 OF 7



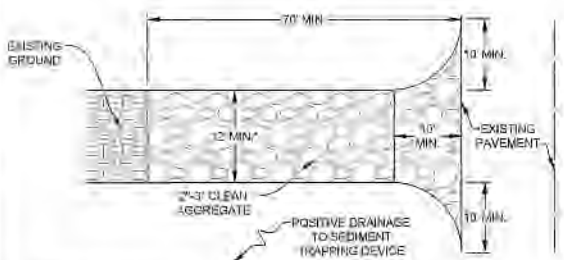
APPROX. PROPERTY LINE

ROCK CONSTRUCTION ENTRANCE

N.T.S.



SIDE ELEVATION



PLAN VIEW

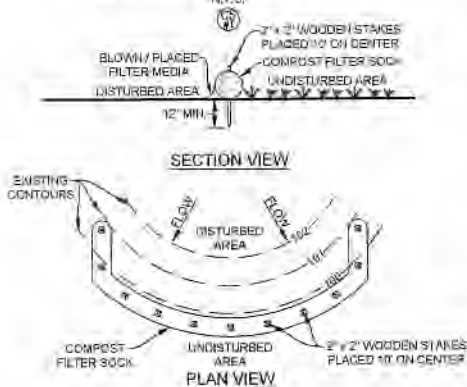


SECTION A-A

PROPERTY OR OTHER APPLICABLE TO THE FOREMARK AND STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL AND V.E. DESIGN.

COMPOST FILTER SOCK

N.T.S.



SECTION VIEW

PLAN VIEW

ADAPTED FROM FILTEXX
SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1. COMPOST SHALL MEET THE FOLLOWING STANDARDS.

ORGANIC MATTER CONTENT	80%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5-8.0
MOISTURE CONTENT	35%-65%
PARTICLE SIZE	85% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 G/L MAXIMUM

NOTES:

1. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8' UP THE SLOPE OR TO A HEIGHT EQUAL TO THE EFFECTIVE SOCK HEIGHT, WHICHEVER IS GREATER. AT 45° TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED MANUFACTURER'S MAXIMUM PERMISSIBLE SLOPE LENGTH.
2. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
3. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE CRITICAL HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
4. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
5. BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS. PHOTOGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
6. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.
7. IN THE EVENT THE GROUND IS FROZEN, #5 REBAR WITH SAFETY CAPS SHALL BE USED INSTEAD OF WOODEN STAKES TO ANCHOR THE FILTER SOCK. SINCE THE GROUND THAW, THE REBAR ANCHORS SHALL BE REMOVED AND REPLACED WITH 2" x 2" WOODEN STAKES AND INSTALLED AS SHOWN IN THE DETAIL ABOVE.

REVEGETATION

TAKEN FROM THE
WEST VIRGINIA EROSION AND SEDIMENT CONTROL
WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION
CHARLESTON, W.VA.
SECTION IV.

TEMPORARY SEEDING

1. GENERAL CONDITIONS WHERE PRACTICE APPLIES
WHERE EXPOSED SOIL SURFACES ARE NOT TO BE FINE-GRADED OR WORKED FOR PERIODS LONGER THAN 21 DAYS. TEMPO WILL GO DIRECTLY INTO A STREAM. IMMEDIATELY UPON CONSTRUCTION OF THE SITE (SITE INCLUDES ROAD AND LOCATION) VEGETATIVE COVER SHALL BE APPLIED TO AREAS THAT WILL BE LEFT UNWORKED FOR A PERIOD OF MORE THAN SIX MONTHS.
2. SEED MIXTURES AND PLANTING DATES
REFER TO TABLES IV-2 THROUGH IV-4 FOR RECOMMENDED DATES TO ESTABLISH VEGETATIVE COVER AND THE APPROVED RECOMMENDED TYPES OF TEMPORARY VEGETATION, RATES OF APPLICATION, AND OPTIMUM SEEDING DATES. (SITUATION) SEEDING RECOMMENDATIONS.
3. SEED APPLICATION
APPLY SEED BY BROADCASTING, DRILLING, OR BY HYDROSEED ACCORDING TO THE RATES INDICATED IN TABLE IV-2. PREPARE AND ROUGHENING OF THE SOIL SURFACE SHOULD BE DONE JUST PRIOR TO SEEDING. SEEDBED PREPARATION MAY NOT BE NECESSARY.

PERMANENT SEEDING

1. GENERAL
PERMANENT VEGETATIVE COVER WILL BE ESTABLISHED WHERE NO FURTHER SOIL DISTURBANCE IS ANTICIPATED OR NECESSARY. SPECIES PLANTED. PLANTING OF PERMANENT VEGETATIVE COVERS MUST BE PERFORMED ON ALL DISTURBED AREAS AFTER TOPSOIL SHALL HAVE THE TOPSOIL REMOVED AND STOCKPILED WHEN FEASIBLE. TOPSOIL SHOULD NOT BE ADDED TO SLOPE PROPER GRADING AND SEEDBED PREPARATION. THE VEGETATION WILL REESTABLISH GROUND COVER FOR THE CONTROL. ALL REQUIRED SEEDBED PREPARATION AND LOOSENING OF SOIL BY DISKING OR DISC TRACKING SHOULD BE PERFORMED PRIOR TO THE RECOMMENDED RATES SHOWN IN TABLES IV-3 AND IV-4. WHEN HYDROSEEDING, SEEDBED PREPARATION MAY NOT BE NECESSARY IF ADEQUATE SITE PREPARATION WAS PERFORMED WHEN HYDROSEEDING. WHEN HYDROSEEDING, FIRST MIX THE LIME, FERTILIZER, AND HYDRO-MULCH IN THE RECOMMENDED AMOUNT OF WATER. MIX SLURRY JUST BEFORE SEEDING. APPLY THE SLURRY UNIFORMLY OVER THE PREPARED SITE. ASSURE THAT AGITATION IS OF INITIAL MIXING.
2. LIME AND FERTILIZER
1. LIME SHALL BE APPLIED TO ALL PERMANENT SEEDINGS. THE PH OF THE SOIL IS TO BE DETERMINED AND LIME APPLIED ACCORDING TO TABLE IV-5.
2. FERTILIZER SHALL BE APPLIED IN ALL PERMANENT SEEDINGS. APPLY THE EQUIVALENT FOR 500 LBS. MINIMUM 10-20-00 CERTIFIED SOIL TEST.
3. APPLICATION: FOR BEST RESULTS AND MAXIMUM BENEFITS, THE LIME AND FERTILIZER ARE TO BE APPLIED AT THE TIME OF SEEDING.
3. PERMANENT SEED MIXTURES
PLANNERS SHOULD TAKE INTO CONSIDERATION THE SPECIES MAKEUP OF THE EXISTING PASTURE AND THE LANDOWNER'S TABLES IV-3A AND IV-3B. PERMANENT SEEDING MIXTURES SUITABLE FOR ESTABLISHMENT IN WEST VIRGINIA.
NOTES:
1. ALL LEGUMES MUST BE PLANTED WITH THE PROPER INOCULANTS PRIOR TO SEEDING.
2. LATHO' FLATPEA IS POTENTIALLY POISONOUS TO SOME LIVESTOCK.
3. ONLY TENDRYPHYTIC FREE VARIETIES OF TALL FESCUE SHOULD BE USED. TALL FESCUE AND CROWN VETCH ARE ALSO VARIETIES OF TALL FESCUE.
4. FOR UNPREPARED SEEDBEDS OR SEEDING OUTSIDE THE OPTIMUM TIMEFRAMES, ADD 50% MORE SEED TO THE SPECIFIED RATES. MIXTURES IN ITALIC ARE SUITABLE FOR USE IN SHADED WOODLAND SETTINGS. MIXTURES IN ITALIC ARE SUITABLE FOR USE IN FILTER PASTURE.
4. SEEDING FOR WILDLIFE HABITAT
CONSIDER THE USE OF THE NATIVE PLANTS OR LOCALLY ADAPTED PLANTS WHEN SELECTING COVER TYPES AND SPECIES. SEEDING SHOULD BE CONSIDERED. SEE WILDLIFE FRIENDLY SPECIES/MIXTURES IN TABLE IV-4B. CONSIDER SELECTING #10 OR LOW WITH EQUIPMENT.

MULCHING

1. GENERAL ORGANIC MULCHES
THE APPLICATION OF STRAW, HAY, OR OTHER SUITABLE MATERIALS TO THE SOIL SURFACE TO PREVENT EROSION, STRAW IS ENCOURAGED DUE TO THE RISK OF SPREADING INVASIVE SPECIES. MULCH MUST BE APPLIED TO ALL TEMPORARY AND PERMANENT SUCH AS WATERWAYS OR STEEP SLOPES. ADDITIONAL OR SUBSTITUTE SOIL PROTECTIVE MEASURES MAY BE USED IF SEED CONTROL MATTING.
AREAS THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDING SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING. CRUSTING AND SEALING OF THE SOIL SURFACE, AND PROVIDE A SUITABLE MICROCLIMATE FOR SEED GERMINATION.
AREAS THAT CANNOT BE SEEDING BECAUSE OF THE SEASON SHOULD BE MULCHED TO PROVIDE SOME PROTECTION TO THE SEEDS AS SOON AS WEATHER OR SEASONAL CONDITIONS PERMIT. DO NOT USE FIBER MULCH (CELLULOSE-HYDROSEED) FOR PROTECTION OF OTHER TYPES OF MULCH.
WOOD CELLULOSE FIBER MULCH IS USED IN HYDROSEEDING OPERATIONS AND APPLIED AS PART OF THE SLURRY. IT CREATES A WEAVABLE MAT. FIBER MULCH DOES NOT ALONE PROVIDE SUFFICIENT PROTECTION ON HIGHLY ERODIBLE SOILS. OR ALONE DURING THE DRY SUMMER MONTHS OR WHEN USED FOR LATE FALL MULCH COVER. USE STRAW MULCH DURING THE WINTER. MULCH IS WELL SUITED FOR STEEP SLOPES, CRITICAL AREAS, AND AREAS SUSCEPTIBLE TO WIND.
2. CHEMICAL MULCHES, SOIL BINDERS, AND TACKIFIERS
A WIDE RANGE OF SYNTHETIC SPRAY ON MATERIALS ARE MARKETED TO STABILIZE AND PROTECT THE SOIL SURFACE. THEY ARE USED IN SOME CASES AS TEMPORARY STABILIZERS, OR IN COMBINATION WITH FIBER MULCH, STRAW, OR HAY. WHEN USED ALONE, MOST CHEMICAL MULCHES DO NOT HAVE THE CAPABILITY TO INSULATE THE SOIL OR RETAIN SOIL MOISTURE.
3. SPECIFICATIONS
FROM TABLE IV-3 SELECT THE TYPE OR MULCH AND RATE OF APPLICATION THAT WILL BEST SUIT THE CONDITIONS AT THE SITE.
4. ANCHORING
DEPENDENT ON THE FIELD SITUATION, MULCH MAY NOT STAY IN PLACE BECAUSE OF WIND ACTION OR RAPID WATER RUNOFF.
1. MECHANICAL ANCHORING
APPLY MULCH AND PULL MULCH ANCHORING TOOL OVER THE MULCH. WHEN A DISK IS USED, SET THE DISK STRAIGHT, AND FOLLOW MANUFACTURER'S RECOMMENDATION WHEN POSITIONING AND STAPLING THE MULCH NETTING TO THE SOIL.

ANTERO'S PREFERRED SEED MIXTURE

HALL'S #1 PASTURE MIXTURE			
Species / Contains	Pure Seed	Gen	Origin
Basford Intermediate Ryegrass	29.95%	90%	OR
Climax Timothy	24.86%	90%	CAN
Annual Ryegrass T	24.92%	90%	OR
Midland Red Clover*	9.99%	90%	OR
Polaris Orchardgrass	9.48%	90%	OR
Other Crop Seeds:	0.07%		* Variety Not Stated
Inert Matter:	0.66%		
Weed Seeds:	0.02%		

Table IV-1
Recommended Seeding Dates

Planting Dates	Suitability
March 1 - April 15 and August 1 - October 1	Best Seeding Periods
April 15 - August 1	HIGH RISK - moisture stress likely
October 1 - December 1	HIGH RISK - freeze damage to young seedlings
December 1 - March 1	Good seeding period. Dormant seeding

NOTE:
Annual
Field
Sp
Su
W
Win
Japa
Ann
Sp

RY VEGETATIVE COVER WITH SEDIMENT CONTROLS MUST BE ESTABLISHED WHERE RUNOFF
EGETATION MUST BE ESTABLISHED ON ROAD BANK AND LOCATION SLOPES. A PERMANENT

S OF TEMPORARY AND PERMANENT PLANT SPECIES AND PLANTING RATES. TABLE IV-3 GIVES
WHERE ANOTHER COVER IS DESIRED, CONTACT THE LOCAL SOIL CONSERVATION DISTRICT FOR

ALL PLANTING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. NECESSARY SITE PREPARATION
QUIRED ON NEWLY DISTURBED AREAS.

SOIL FERTILITY AND PH LEVEL SHOULD BE TESTED AND ADJUSTED ACCORDING TO SEED
OMPLETION OF THE DRILLING PROCESS. ANY SITE THAT CONTAINS SIGNIFICANT AMOUNTS OF
STEEPER THAN 2:1 UNLESS A GOOD BONDING TO THE SUB-LAYER CAN BE ACHIEVED. AFTER
SURFACE WATER RUNOFF EROSION.

INCORPORATE THE APPROPRIATE AMOUNT OF LIME AND/OR FERTILIZER IN THE SLURRY MIX.

THE SEED AND INOCULANTS TOGETHER WITHIN ONE HOUR PRIOR TO PLANTING, AND ADD TO THE
TINUOUS THROUGHOUT THE SEEDING OPERATION AND THE MIX IS APPLIED WITHIN ONE HOUR

ACCORDINGLY. ONCE THE PH IS KNOWN, SELECT THE AMOUNT OF LIME TO BE APPLIED FROM TABLE

FERTILIZER PER ACRE OR USE THE AMOUNT OF FERTILIZER AND LIME RECOMMENDED BY A

SEEDBED PREPARATION.

URE PASTURE MANAGEMENT PLANS WHEN RECOMMENDING SEED MIXTURES. SELECTION FROM

INVASIVE SPECIES, NON-NATIVE TO WV.

RATE. MIXTURES IN TABLE IV-4B ARE MORE WILDLIFE AND FARM FRIENDLY. THOSE LISTED IN
RIPS.

WILDLIFE HABITAT. WILDLIFE FRIENDLY SPECIES OR MIXES THAT HAVE MULTIPLE VALUES
NTENANCE LONG-LIVED PLANTS ADAPTABLE TO SITES WHICH MAY BE DIFFICULT TO MAINTAIN

DE FROM WHEAT OR OATS IS THE PREFERRED MULCH. THE USE OF HAY IS PERMISSIBLE, BUT NOT
NENT SEEDING ON ALL DISTURBED AREAS. DEPENDING ON SITE CONDITIONS. IN CRITICAL AREAS
NECESSARY. EXAMPLES INCLUDE JUTE MESH AND SOIL STABILIZATION BLANKETS OR EROSION

MULCHES CONSERVE DESIRABLE SOIL PROPERTIES, REDUCE SOIL MOISTURE LOSS, PREVENT

IL SURFACE. AN ORGANIC MULCH, STRAW OR HAY SHOULD BE USED AND THE AREA THEN
ONE FOR THIS PRACTICE. AT NORMAL APPLICATION RATES IT WILL NOT GIVE THE SOIL

IN THE BEST SEED-SOIL CONTACT WHEN APPLIED OVER THE TOP OF (AS A SEPARATE OPERATION)
URING LESS THAN FAVORABLE GROWING CONDITIONS. FIBER MULCH SHOULD NOT BE USED
PERIODS AND FIBER MULCH MAY BE USED TO TACK (ANCHOR) THE STRAW MULCH. FIBER

ARE MIXED WITH WATER AND SPRAYED OVER THE MULCH AND TO THE SOIL. THEY MAY BE USED

RE THAT ORGANIC MULCHES HAVE.

IN SUCH CASES, MULCH IS TO BE ANCHORED MECHANICALLY OR WITH MULCH NETTING,

PULL ACROSS SLOPE. MULCH MATERIAL SHOULD BE TUCKED INTO THE SOIL ABOUT 3".

Table IV-2
Acceptable Fertilization Recommendation

Species	N (lbs/ac)	P2O5 (lbs/ac)	Example Rec. (per acre)
Cool Season Grass	40	80	400 lbs. 10-20-20
CS Grass & Legume	30	60	300 lbs. 10-20-20
Temporary Cover	40	40	200 lbs. 19-19-19

Table IV-3
Temporary Cover

Species	Seeding Rate (lbs/acre)	Optimum Seeding Dates	Drainage	pH Range
Ryegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Poorly	5.5 - 7.5
Orchardgrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Mod. Well	6.0 - 7.0
Oats	96	3/1 - 6/15	Well - Poorly	5.5 - 7.0
Ryegrass	40	5/15 - 8/15	Well - Poorly	5.5 - 7.5
Per Ryegrass	168	8/15 - 10/15	Well - Poorly	5.5 - 7.5
Wheat	180	8/15 - 11/15	Well - Mod. Well	5.5 - 7.0
Red Top Millet	30	6/15 - 8/15	Well	4.5 - 7.0
Redtop	5	3/1 - 6/15	Well	4.0 - 7.5
Ryegrass	26	3/1 - 6/15	Well - Poorly	5.5 - 7.5
Oats	64	3/1 - 6/15	Well - Poorly	5.5 - 7.5

ese rates should be increased by 50% if planted April 15 - August 1 and October 1 - March 1.

Table IV-4A
Permanent Seeding Mixture

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
Crownvetch /	10 - 15	Well - Mod. Well	5.0 - 7.5
Tall Fescue	30		
Crownvetch /	10 - 15	Well - Mod. Well	5.0 - 7.5
Perennial Ryegrass	20		
Flatpea or Perennial Pea /	20	Well - Mod. Well	4.0 - 8.0
Tall Fescue	15		
Ladino Clover /	30		
Serecia Lespedeza /	25	Well - Mod. Well	4.5 - 7.5
Tall Fescue	2		
Tall Fescue /	40		
Ladino Clover /	3	Well - Mod. Well	5.0 - 7.5
Redtop	3		
Crownvetch /	10		
Tall Fescue /	20	Well - Mod. Well	5.0 - 7.5
Redtop	3		
Tall Fescue /	40		
Birdsfoot Trefoil /	10	Well - Mod. Well	5.0 - 7.5
Redtop	3		
Serecia Lespedeza /	25		
Tall Fescue /	30	Well - Mod. Well	4.5 - 7.5
Redtop	3		
Redtop /	30		
Tall Fescue /	3	Well - Mod. Well	5.0 - 7.5
Creeping Red	50		
Tall Fescue /	50	Well - Poorly	4.5 - 7.5
Perennial Ryegrass /	10		
Tall Fescue /	15	Well - Poorly	5.8 - 8.0
Lathco Flatpea *	20		

* Lathco Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table IV-4B
Wildlife and Farm Friendly Seed Mixtures

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
KY Bluegrass /	20		
Redtop /	3	Well - Mod. Well	5.5 - 7.5
Ladino Clover or Birdsfoot Trefoil	2 / 10		
Timothy /	5	Well - Mod. Well	6.5 - 8.0
Alfalfa	12		
Timothy /	5	Well - Poorly	5.5 - 7.5
Birdsfoot Trefoil	8		
Orchardgrass /	10		
Ladino Clover /	2	Well - Mod. Well	5.5 - 7.5
Redtop	3		
Orchardgrass /	10	Well - Mod. Well	5.5 - 7.5
Ladino Clover	2		
Orchardgrass /	20	Well - Mod. Well	5.5 - 7.5
Perennial Ryegrass	10		
Creeping Red Fescue /	30	Well - Mod. Well	5.5 - 7.5
Perennial Ryegrass	10		
Orchardgrass or KY Bluegrass	20	Well - Mod. Well	6.0 - 7.5
Birdsfoot Trefoil /	10		
Redtop /	5	Well - Mod. Well	5.5 - 7.5
Orchardgrass	20		
Lathco Flatpea *	30	Well - Mod. Well	5.5 - 7.5
Perennial Ryegrass	20		
Lathco Flatpea *	30	Well - Mod. Well	5.5 - 7.5
Orchardgrass	20		

* Lathco Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table IV-5
Lime and Fertilizer Application Table

pH of Soil	Lime in Tons per Acre	Fertilizer, Lbs. per Acre (10-20-20 or Equivalent)
Above 6.0	2	500
5.0 to 6.0	3	500
Below 5.0	4	500

The pH can be determined with a portable pH testing kit or by sending the soil samples to a soil testing laboratory. When 4 tons of lime per acre are applied it must be incorporated into the soil by disking, backblading or tracking up and down the slope.

Table IV-6
Mulch Materials Rates and Uses

Material	Minimum Rates per acre	Coverage	Remarks
Hay or Straw	2 to 3 Tons	Cover 75% to 90% of Surface	Subject to wind blowing or washing unless tied down
Wood Fiber	100 to 150 lbs	Cover all	For hydroseeding
Pulp Fiber	1000 to 1500 lbs	Disturbed	Areas
Wood - Cellulose			
Recirculated Paper			



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REVISION

DATE



CONSTRUCTION DETAILS

API#47-017-03069

WELL #1

CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA



DATE: 10/19/2018

SCALE: N/A

SHEET 7 OF 7



October 26, 2018

West Virginia Department of Environmental Protection
Office of Oil and Gas
Attn: Mr. Jeff McLaughlin
601 57th Street, SE
Charleston, WV 25304

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office 303.357.7310
Fax 303.357.7315

RE: Existing GW Hill #1 Well (API# 47-017-03069)

Mr. McLaughlin:

Antero Resources Corporation (Antero) would like to submit the following application for a permit to plug and abandon the existing well located on property owned by Antero Resources Corporation in Doddridge County, West Virginia.

Attached you will find the following:

- Plug and Abandon Permit Application package
- Form WW-7 Well Location Form: GPS and Topo Map

If you have any questions please feel free to contact me at (303) 357-6820.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in blue ink, appearing to read "Karin Cox", is written over a light blue circular stamp.

Karin Cox
Permitting Agent
Antero Resources Corporation

RECEIVED
Office of Oil and Gas

OCT 30 2018

WV Department of
Environmental Protection

Enclosures

CERTIFIED MAIL RECEIPT
G.W. HILL 1
WW-4A & 4B NOTICE OF APPLICATION TO
PLUG & ABANDON A WELL
TO SURFACE OWNER

RECEIVED
Office of Oil and Gas

OCT 30 2018

WV Department of
Environmental Protection

Cut on dotted line.

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