

### west virginia department of environmental protection

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

March 19, 2014

### WELL WORK PERMIT

### Horizontal 6A Well

This permit, API Well Number: 47-1706468, issued to ANTERO RESOURCES CORPORATION, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

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

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

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

James Martin

Chief

Operator's Well No: BAKER UNIT 1H

Farm Name: TRENT, CLARENCE, JR. .. ET AL

API Well Number: 47-1706468

Permit Type: Horizontal 6A Well

Date Issued: 03/19/2014

# **PERMIT CONDITIONS**

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

### CONDITIONS

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

1.01706468

WW-6B (9/13)

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

1) Well Opera	tor: Antero Re	esources Corporation	494488557	017- Doddridge	Greenbrier	New Milton 7.5'
			Operator ID	County	District	Quadrangle
2) Operator's	Well Number:	Baker Unit 1H	Well Pa	d Name: Trent	Pad (existing	ng)
3) Farm Name	/Surface Owne	er: Clarence Trent, J	r. et al Public Ro	ad Access: Stan	ding Stone	Road CR 46
4) Elevation, c	current ground:	1410' El	evation, proposed	post-construction	n: 1410'	
5) Well Type	(a) Gas	oil	Und	lerground Storag	е	
	***	Shallow Horizontal	Deep			Ç
6) Existing Pa	d: Yes or No					
7) Proposed Ta	arget Formation	n(s), Depth(s), Antic Anticipated Thickness:	7		ressure(s):	1
3) Proposed To	otal Vertical De	epth: 7700' TVD				
) Formation a	t Total Vertica	l Depth: Marcellus S	Shale			
0) Proposed	Total Measured	Depth: 18,300' MD	)			
1) Proposed I	Horizontal Leg	Length: 10,053'				
2) Approxima	ate Fresh Water	r Strata Depths:	135'			
		ALLA STATE OF THE			To In-	
3) Method to	Determine Fres	sh Water Depths: E	sowen Unit 2H (47-C	017-06167) on san	ie pad.	
	Determine Fres ate Saltwater D		sowen Unit 2H (47-C	)17-06167) on san	ie pad.	
4) Approxima		epths: 2126'	sowen Unit 2H (47-C			
14) Approxima 15) Approxima	ate Saltwater Date Coal Seam I	epths: 2126'				D Gas
<ul><li>(4) Approxima</li><li>(5) Approxima</li><li>(6) Approxima</li><li>(7) Does Propo</li></ul>	ate Saltwater De ate Coal Seam I ate Depth to Po- osed well locati	Pepths: 2126' Depths: 708'	ne, karst, other):	None anticipated	AECENE POILS	ED Gas and Gas
<ul><li>(4) Approxima</li><li>(5) Approxima</li><li>(6) Approxima</li><li>(7) Does Propolirectly overlying</li></ul>	ate Saltwater De ate Coal Seam I ate Depth to Po- osed well locati	Depths: 2126' Depths: 708' essible Void (coal minion contain coal sean to an active mine?	ne, karst, other):	None anticipated	RECEIVE OIL S	2014
<ul><li>(4) Approxima</li><li>(5) Approxima</li><li>(6) Approxima</li><li>(7) Does Propolirectly overlying</li></ul>	ate Saltwater Date Coal Seam I ate Depth to Poo osed well locati ing or adjacent	Depths: 2126' Depths: 708' essible Void (coal minion contain coal sean to an active mine?	ne, karst, other):	None anticipated	RECEIVE OIL S	artment of
<ul><li>(4) Approxima</li><li>(5) Approxima</li><li>(6) Approxima</li><li>(7) Does Propolirectly overlying</li></ul>	ate Saltwater Date Coal Seam I ate Depth to Poo osed well locati ing or adjacent	Depths: 2126' Depths: 708' ssible Void (coal minor contain coal seam to an active mine?  b: Name:	ne, karst, other):	None anticipated	RECEIVE OIL S	artment of antal Protection

# 18)

# **CASING AND TUBING PROGRAM**

ТҮРЕ	Size	New or Used	<u>Grade</u>	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	310'	310'	CTS, 431 Cu. Ft
Coal	9-5/8"	New	J-55	36#	2450'	2450'	CTS, 998 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	18300'	18300'	4640 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#	,	7100'	
Liners						<del>-</del>	

7c20.2014

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

# **PACKERS**

Kind:	N/A	
Sizes:	N/A	Received
Depths Set:	N/A	
		FFB 2 1 2014

Office of Oil and Gas
WV Dept. of Environmental Protection

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WW-6B (9/13)

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:
Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale.
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."
21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 12.37 acres (existing)
22) Area to be disturbed for well pad only, less access road (acres):  6.403 acres (existing)
23) Describe centralizer placement for each casing string:
Conductor: no centralizers Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface. Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.
24) Describe all cement additives associated with each cement type:
Conductor: no additives, Class A cement. Surface: Class A cement with 2-3% calcium chloride
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51 Production: Tall 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.
Received
*Note: Attach additional sheets as needed,

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API Number 47 -	017	
Operator's	Well No.	Baker Unit 1H

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

## FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

operator rame	es Corporation	OP Code _494488557	
Watershed (HUC 10)_Standing	stone Run of Meathouse Fork	Quadrangle New Milton 7.5'	
Elevation 1410	County_Doddridge	District Greenbrier	
Do you anticipate using more the Will a pit be used? Yes		ed frac pit will be used for flowback fluids)	1
If so, please describe a	the state of the s	wback Fluids	pc
Will a synthetic liner b	e used in the pit? Yes No	If so, what ml.? 60 mil.	1
Proposed Disposal Me	hod For Treated Pit Wastes:		N
	Application		1
	rground Injection (UIC Permit Numb		
		ations when applicable, API# will be provided on Form WR-34	
Other	(Explain	disposal location) (Meadowfill Landfill Permit #SWF-1032-98)	
	(		
Will closed loop system be used	? If so, describe: Yes		
Drilling medium anticipated for	this well (vertical and horizontal)? Ai	r, freshwater, oil based, etc. Dist/Stiff Fram, Production - Water Based Mud	
	? Synthetic, petroleum, etc. N/A		
Additives to be used in drilling i			
		Clared in tente account of the	
		etc. Stored in tanks, removed offsite and taken to landfill.	
-If left in pit and plan to	solidify what medium will be used?	(cement, lime, sawdust)_N/A	
-Landfill or offsite nam	e/permit number? Meadowfill Landfill (Pe	rmit #SWF-1032-98)	
on August 1, 2005, by the Office provisions of the permit are enf- aw or regulation can lead to enf- I certify under penalty application form and all attach obtaining the information, I be	of Oil and Gas of the West Virginia I precable by law. Violations of any te precement action.  of law that I have personally examinents thereto and that, based on ments thereto and that, based on ments.	ns of the GENERAL WATER POLLUTION PERMIT issued the compartment of Environmental Protection. I understand that arm or condition of the general permit and/or other applicated and am familiar with the information submitted on the compartment of those individuals immediately responsible curate, and complete. I am aware that there are signification or imprisonment.	the ble his
Company Official (Typed Name	Donald Gray	FEB 2 1 201	4
	nmental Manager	1	2
A TABLE AND		Office of Oil and G	20
	10 10 10	WV Dept. of Environmental	Prot
Subscribed and sworn before me		LISA BOLLINELLI	
hos bu	VI.	Notary Public Public State of Colorado	
	11/2/2011	State of Colorado Notary ID 20124072365	
ly commission expires	11/9/2016	My Commission Expires Nov 9, 2016	

Form WW-9		Operator's V	Vell No. Baker Unit 1H
Antero Resource	es Corporation	Optimo: 3 v	7011 110.
Lime <u>2-3</u>	Tons/acre or to correct to pH	6.5	H
	or straw or Wood Fiber (will be used y	where needed)	
Fertilizer amount_		os/acre	
Mulch 2-3 Existing Access Roads	Tons/a (2.544) + Existing Well Ped (6.403) + Existing Fr	acre ne Pit (2,528) + Existing Stockpiles (.895) = 12.37	Existing Acres
•	-	d Mixtures	•
1	Cemporary	Perma	nent
Seed Type Oats	lbs/acre 168	Seed Type Tall Fescue	lbs/acre 50
Rye	120		
*or type of grass seed r	equested by surface owner	*or type of grass seed requi	ested by surface owner
provided) Photocopied section of invo	olved 7.5' topographic sheet.		
Plan Approved by:	oughs Newlor		
Comments: Sead		disturbed are	a5 10 WD
Title: Oil + Gae	unspector	Date: Z - 20 Z	014
Field Reviewed? (	Yes (	) No	Receive

FEB 2 1 2014



# Well Site Safety Plan Antero Resources

Well Name: Cox Unit 1H, Cox Unit 2H, Bowen Unit 1H, Bowen Unit 2H, and Standings Unit 1H

Pad Location: TRENT PAD

Doddridge County/Greenbrier and New Milton Districts

GPS Coordinates: Lat 39°12'33.52"/Long 80°37'45.16"

# **Driving Directions:**

From the intersection of interstate 50 and WV 18 S, head south along the 18 for 6.3 miles. Turn left onto Co Route 25/Meathouse Fork for 7.3 miles. Take a left onto Co Route 25/11 for 1.75 miles. Take a left onto Co Route 25/7 for 0.65 miles. Lease road will be on the left.

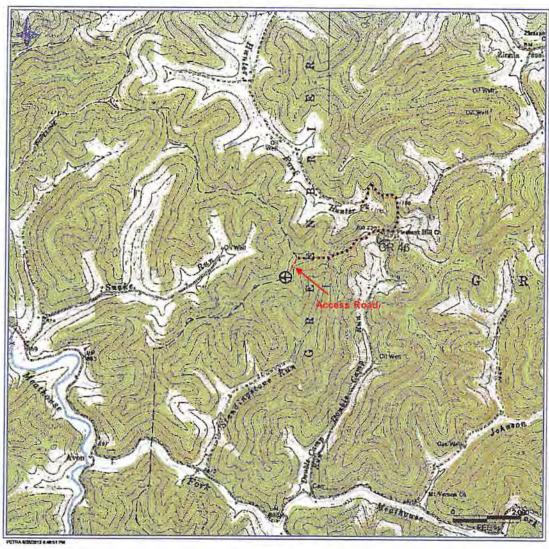
10 N. 3/14/13 SDW

Received

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SSP Page 1

plat gattal 4701706468



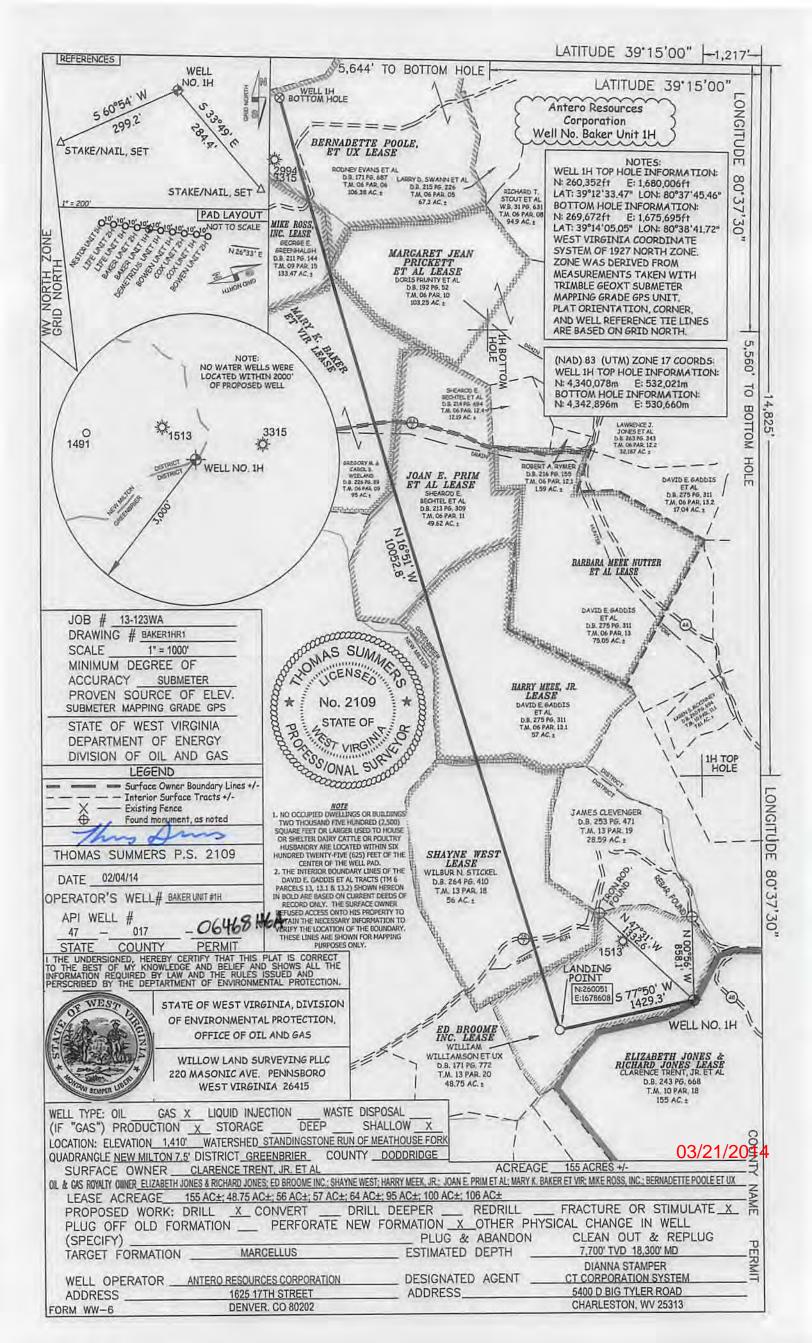
2-20-2014

# Received

FEB 2 1 2014

Office of Oil and Gas WV Dept. or Environmental Protection.

# Antero Resources Corporation APPALACHIAN BASIN Baker Unit 1H County Doddridge 2,000 4,000 FEET QUADRANGLE: NEW MILTON & BIG ISAAC WATERSHED: STANDINGS RUN DISTRICT: GREENBRIER DISTRICT: Date: 9/12/2012



PROJECT LOCATION-

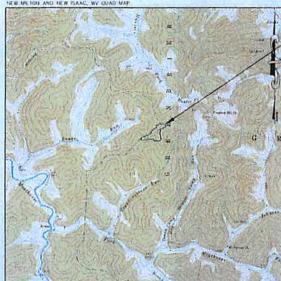


# **ANTERO RESOURCES**

# TRENT SITE DESIGN & **CONSTRUCTION AND EROSION &** SEDIMENT CONTROL PLANS

GREENBRIER AND NEW MILTON DISTRICTS PPROVED **DODDRIDGE COUNTY, WEST VIRGINIA** 

**OCTOBER 4, 2012** 



VICINITY MAP

N: 260360.8993 E: 1648536.7191 LAT: N 39.20931°, 39°12'33.52" LONG: W 80.62921", 80°37'45.16" NAD 83, UTM ZONE 17, METER N: 4340069,733 E: 532012.349

ACCESS ROAD BEGINNING NAD 83, WV STATE PLANES, NORTH, FOOT NAD 83, WV STATE PLANES, NORTH, FOOT N: 260897.5404 E: 1649039.2152 LAT: N 39.21080°, 39°12'38.88" LONG: W 80.62746°, 80°37'38.86" NAD 83, UTM ZONE 17, METER N: 4340235.771 E: 532162.710

PROJECT LOCATION PROJECT LOCATION-**WEST VIRGINIA** API#1706160 API#1706161 API#1706167

WELL NAME	NORTHING	EASTING	LATITUDE	LONGITUDE
UFE UNIT 28	260423,9703	1648582,7632	N 39,20948*	W.80.62905
LIFEUNITAH	260415.0246	1648578.2937	N 39.70946*	W 80,62907
LIFE UNIT 1H	260406.0790	1648571.8241	N 39,20943*	W 80.62908
BAKER UNIT 2H	260397.1334	1648569.3548	N 39,20941*	W 80 62910
BAKERUNITTH	260388.1878	1648564,8854	N 39.20938*	W 80.62911
STANDINGS UNIT 1H	260379.2422	1648560.4159	N 39.20936*	W 80.62913
BOWEN UNIT 1H	260370.2966	1648555,9464	N 39,20934*	W 80,62915
COX UNIT 2H	260161.3510	1648551.4770	N 39.209311	W 80,67916
COX UNIT 1H	260352.4054	1648547.0075	N 39.20929*	W 80.62918
BOWEN UNIT 2H	260343 4568	1648542.5381	N 39 70926*	W 50.62919

REVISION NUMBER	REVISED	BY	DATE	DESCRIPTION
1.	3.4,6,7, 15,16,19	RJH	10/4/12	REMOVED DISTURBANCE OFF OF ADJOINING LANDOWNER
2	6,7,12,15, 19,21	EMS	11/28/12	REVISED ENV. DELINEATION PER O.A.L., ADDED SUMP DETAIL
3	2,7,12-27	EMS	01/16/13	WYDEP OFFICE OF OIL & GAS COMMENTS ADDRESSED

APPROVED FOR PERMITS DATE: APPROVED FOR CONSTRUCTION DATE: 1/16/13 BY: RM

(304) 624-4108

(304) 624-7831

CIVIL . ENVIRONMENTAL . CONSULTING . FIELD SERVICES 30 COLUMBIA BOULEVARD - CLARKSBURG, WV 26301

THE GROUNDARD CONTAINED ALREIN IS THE SOLE PROFESTY OF THRESHER EMORSTEND INC. REPRODUCTION OF THESE DESIGNATION PROFESSION IN THE PROFESSION IN THE PROPERTY PROPERTY. IN MICHIGAN PROPERTY OF ACCUMULATE AND ACCUMULATION OF THE PROPERTY OF OF

FEMA FLOOD MAP

PANEL: 235 OF 325

DODDRIDGE COUNTY, WV