



**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

August 11, 2014

**WELL WORK PERMIT**

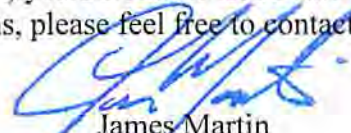
**Horizontal 6A Well**

This permit, API Well Number: 47-7700613, issued to MOUNTAINEER KEYSTONE, LLC, 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: GRAGG 202  
Farm Name: GRAGG, JAMES E.  
**API Well Number: 47-7700613**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 08/11/2014

Promoting a healthy environment.

08/15/2014

## 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.

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### CONDITIONS

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1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE 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 moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. 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.
9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to [DEPOOGNotify@wv.gov](mailto:DEPOOGNotify@wv.gov) within 30 days of commencement of drilling.

WW-6B  
(9/13)

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

77 06 638

1) Well Operator: Mountaineer Keystone, LLC 494501227 Preston Reno Thornton 7.5'  
Operator ID County District Quadrangle

2) Operator's Well Number: Gragg 202 Well Pad Name: Gragg 201-203

3) Farm Name/Surface Owner: James E. Gragg Public Road Access: Rt. 50

4) Elevation, current ground: 1505' Elevation, proposed post-construction: 1500'

5) Well Type (a) Gas  Oil  Underground Storage

Other

(b) If Gas Shallow  Deep

Horizontal

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s): 3/25/14  
Marcellus Shale, 8250' (TVD Heel) 8250' (TVD Toe), 100ft., 0.5 psi/ft

8) Proposed Total Vertical Depth: 8250'

9) Formation at Total Vertical Depth: Marcellus Shale

10) Proposed Total Measured Depth: 14148'

11) Proposed Horizontal Leg Length: 5006'

12) Approximate Fresh Water Strata Depths: surface to 850 feet

13) Method to Determine Fresh Water Depths: Offsetting wells reported water depths (077-00466, 077-00467, 077-00468, 077-004969, 077-00470)

14) Approximate Saltwater Depths: 1000 - 1800'

15) Approximate Coal Seam Depths: Bakerstown - 160', Brush Creek - 260', Upper Freeport - 345', Lower Freeport - 405', Upper Kittanning - 475', Middle Kittanning - 515', Lower Kittanning - 555'

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

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

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

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WW-6B  
(9/13)

18)

**CASING AND TUBING PROGRAM**

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft. (lb/ft)</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill-up (Cu. Ft.)</u>
Conductor	20"	New	H-40	94#	100'	100'	Grout
Fresh Water	13.375"	New	J-55	54.5#	900'	900'	CTS
Coal							
Intermediate	9.625"	New	J-55	36#	1900'	1900'	CTS
Production	5.5"	New	P-110	20#	14,148'	14,148'	TOC@1,700'
Tubing							
Liners							

UKC  
8-8-14

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield (cu. ft./k)</u>
Conductor	20"	30"	0.417"	1530	None	None
Fresh Water	13.375"	17.5"	0.38"	2730	Class A & 1.5% CaCl	1.18
Coal						
Intermediate	9.625"	12.25"	0.352"	3520	Type 1 & 1.5% CaCl	1.18
Production	5.5"	7.875"	0.361"	14360	50/50 - Type 1	1.2
Tubing						
Liners						

**PACKERS**

Kind:				
Sizes:				
Depths Set:				

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Office of Oil and Gas

JUL 30 2014

WV Department of  
Environmental Protection

WW-6B  
(9/13)

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

The well will be started with a conductor rig drilling a 30" hole to Conductor programmed depth then running 20" casing and grout cement back to surface. The conductor rig will move out and the drilling rig will move in and rig up. The drilling rig will then spud a 17 1/2" hole and drill to fresh water casing (Surface) to the programmed depth, Run 13- 3/8" casing and cement to surface. The rig will continue drilling a 12- 1/4" intermediate hole to the programmed depth, run 9- 5/8" casing and cement to surface. The rig will then continue to drill a 8- 3/4" hole vertically to a programmed depth, run wireline logs and then plug back the well with the programmed cement to a designed KOP. We will then start drilling the curve and lateral section to the programmed total measured depth, run 5 1/2" casing and cement according to the program.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

The well will be completed using a plug and perforation method and stimulated with a slickwater and sand slurry. The anticipated maximum rate will be 90 bpm and the maximum pressure will be 9,500 psi.

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

16.5 acres

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

12.6 acres

23) Describe centralizer placement for each casing string:

20" - No centralizers  
 13 3/8" - one bow spring centralizer on every other joint  
 9 5/8" - one bow spring centralizer every third joint from TD to surface  
 5 1/2" - one semi rigid centralizer on every joint from TD of casing to end of curve. Then every other joint to KOP. Every third joint from KOP to 1,750' TOC will be 1,750'; there will be no centralizers from 1750' to surface.

24) Describe all cement additives associated with each cement type:

\*See attached sheet

25) Proposed borehole conditioning procedures:

\*See attached sheet

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APR 15 2014

\*Note: Attach additional sheets as needed.



## Gragg 202

### Cement Additives

- ✓ • 20" is auger drilled and grouted back to surface.
- The 13-3/8" casing will be cemented to surface with Class A cement and no greater than 3% CaCl (Calcium Chloride).
- The 9-5/8" casing will be cemented to surface with Type 1 cement and no greater than 3% calcium choride.
- The 5-1/2" production string will be cemented back to 1750' (+/- 200' above the casing shoe for the 9-5/8") with Type 1 or Class A cement retarder (to extend pumpability) cellophane flaked for fluid loss, Bentonite gel as an extender (increased pumpability and fluid loss), a defoaming agent to decrease cement foaming during mixing to insure the cement is of proper weight to placement and possibly a gypsum gas blocking additive to aid in blocking/gas migration (in combination with other additives mentioned here, helps cement achieve a "right-angle" set) during the plastic phase of the cement set-up.

### Proposed Borehole Conditioning Procedures:

- Top holes will be drilled on fluid to KOP. At KOP, the wellbore will be loaded with water based mud, barite-weighted mud system with such properties to build a filter-cake on the face to the bore-hole. This will provide lubricity as well as stabilizing the well bore. We will begin rotating the drill string and mud will be circulated upon reaching TD until no further cuttings are observed coming across the shaker screens. Once clean mud is circulated back to surface, we will pull three stands of drill pipe, load the hole, pull three stands and load the hole. The weight indicator on the rig will be monitored for any occurrences of drag and if any are noticed, we will re-run the previous stand of pipe pulled across and circulate 2X bottoms up while watching the shakers for signs of cuttings. Once at the base of the curve, the string will be continuously rotated while pumping 2X bottoms up. We will pull three stands and fill the hole until we reach the vertical section of the well.

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Office of Oil and Gas  
 West Virginia Department of Environmental Protection

08/15/2014



WW-9  
(9/13)

API Number 47 - \_\_\_\_\_ - \_\_\_\_\_  
Operator's Well No. Gragg 202

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Mountaineer Keystone, LLC OP Code 494501227

Watershed (HUC 10) Little Sandy Creek Quadrangle Thornton 7.5'

Elevation 1500' County Preston District Reno

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes  <sup>UKC</sup> 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
  - Underground Injection ( UIC Permit Number \_\_\_\_\_ )
  - Reuse (at API Number \_\_\_\_\_ )
  - Off Site Disposal (Supply form WW-9 for disposal location)
  - Other (Explain \_\_\_\_\_ )
- AS*  
3/24/15

Will closed loop system be used? If so, describe: Yes. It will contain all of the drilling medium and drill cuttings to be taken to landfill.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Vert: Freshwater, Horiz: water based mud

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

Additives to be used in drilling medium? Sodium Chloride, Xanthan Gum, PAC R/SL, Caustic Soda, Soda Ash, Barite, Defoamer

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

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

-Landfill or offsite name/permit number? Tucker County Landfill, Davis, WV

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, 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 *Nathan Skeen*

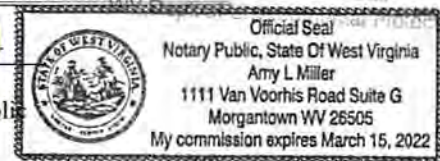
Company Official (Typed Name) Nathan Skeen

Company Official Title Designated Agent

Subscribed and sworn before me this 25<sup>th</sup> day of March, 20 14

*Amy L Miller* Notary Public

My commission expires 3-15-2022



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Form WW-9

Operator's Well No. Gragg 202

Mountaineer Keystone, LLC

Proposed Revegetation Treatment: Acres Disturbed 12.6 Prevegetation pH \_\_\_\_\_

Lime 6 Tons/acre or to correct to pH 6.5

Fertilizer type 10-20-20

Fertilizer amount 1000 lbs/acre

Mulch 3-4 Tons/acre

**Seed Mixtures**

**Temporary**

**Permanent**

Seed Type	lbs/acre
KY-31 Tall Fescue	50
_____	_____
_____	_____
_____	_____

Seed Type	lbs/acre
Fosters Premium Meadow Mix	50 *See attached sheet
_____	_____
_____	_____
_____	_____

**Attach:**

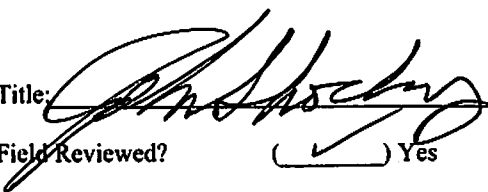
Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: \_\_\_\_\_

Comments: Seed & MULCH ASAP

**Received**

Title: 

Date: 3/27/13 APR \_\_\_\_\_

Field Reviewed?  Yes  No

**FOSTER PREMIUM MEADOW MIX** **LOT LFM1203**

* VARIETY NOT STATED		TOTAL	
PURE SEED	VARIETY	SEED	SEED
42.63 %	NAYMATE XL ORCHARDGRASS	OR	90 % 0 % 90 %
13.50 %	GULF ANNUAL RYEBASS	OR	90 % 0 % 90 %
14.50 %	CLIMAX TIMOTHY	OR	90 % 0 % 90 %
14.70 %	ARCTIC GREEN PERENNIAL RYEBASS	OR	90 % 0 % 90 %
7.89 %	MEDIUM RED CLOVER	OR	90 % 10 % 90 %
2.29 %	CROP SEED		
3.42 %	HERT MATTER		
.33 %	WEED SEED		

TESTED: 4-2013  
 NET WEIGHT: 50 LBS 22.68 KG

**LA CROSSE FORAGE & TURF SEED L.L.C.**  
 P.O. BOX 995  
 LA CROSSE, WI 54602

NOXIOUS WEED SEED PER POUND: NONE

Make No Claims: We warrant that seeds sold in this container have been tested and approved under State and Federal Seed Laws and they conform to the test procedures. We make no other or further warranty, expressed or implied.

We hereby warrant that we warrant that seeds sold in this container have been tested and approved under State and Federal Seed Laws and they conform to the test procedures. We make no other or further warranty, expressed or implied.

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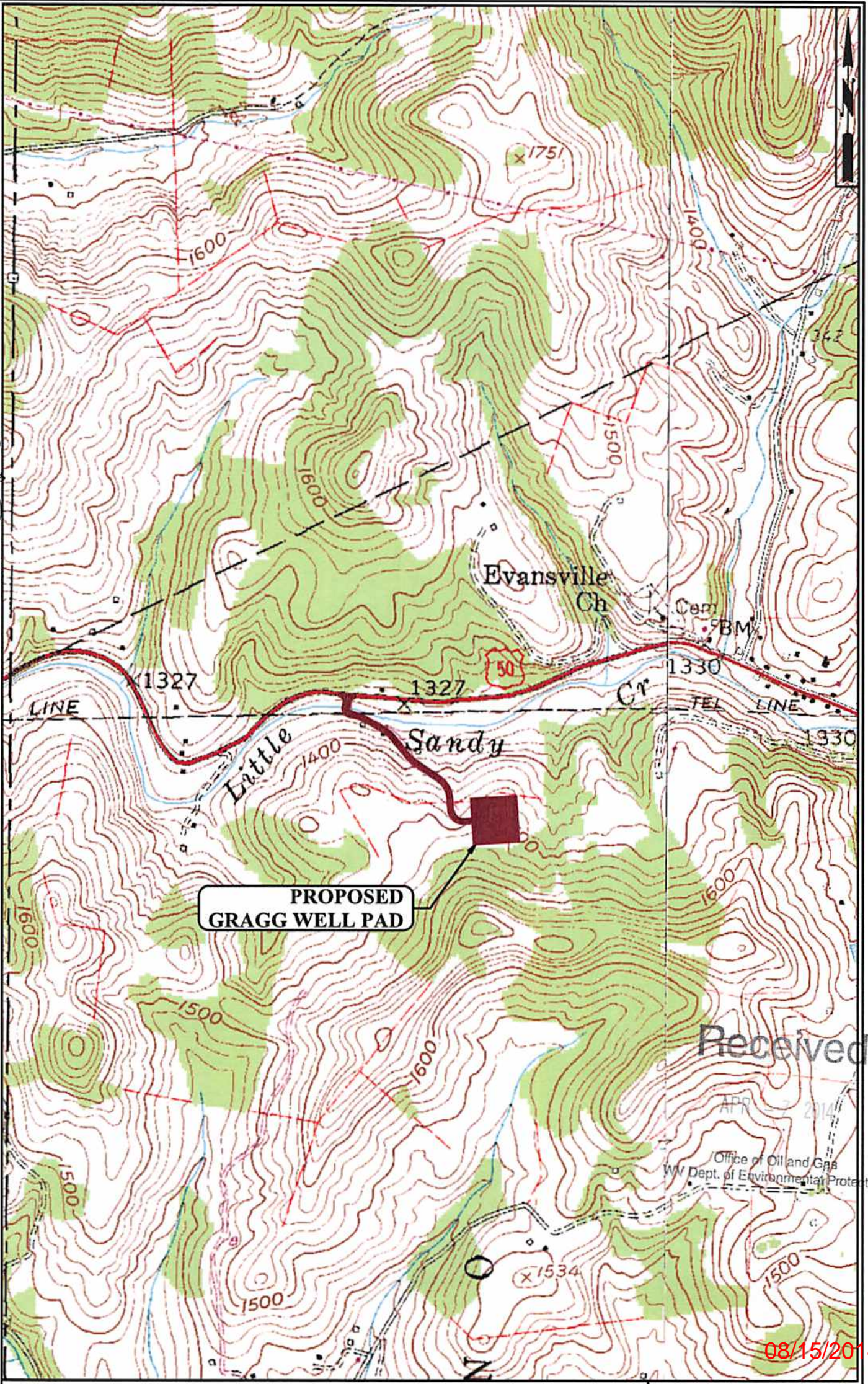
Office of Oil and Gas  
 WY Dept. of Environmental Protection

08/15/2014

USER: patricia a. escoriaza

PLOT DATE/TIME: 3/27/2014 2:34 PM

CAD FILE: R:\030-2476 - Mountaineer Keystone - Gragg Well Pad\Drawings\z-2476-WW9-Cover.dwg

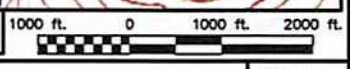


**PROPOSED GRAGG WELL PAD**

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08/15/2014

PROJECT# 030-2476



**THRASHER**  
 THE THRASHER GROUP INC.  
 CIVIL • ENVIRONMENTAL • CONSULTING • FIELD SERVICES  
 600 WHITE OAKS BOULEVARD, BRIDGEPORT, WV 26330  
 PHONE (304) 624-4106 • FAX (304) 624-7831

**Mountaineer**  
**Keystone**  
 LLC

**GRAGG WELL PAD**  
 GLADESVILLE AND FELLOWSVILLE, WV  
 QUAD MAPS

SHEET No.  
**1**

**MOUNTAINEER KEYSTONE  
WELL NO. GRAGG 202**

**NOTES:**  
PLAT BASED ON NAD 2011 (CORS) WV STATE PLANE NORTH. GRID NORTH ELEVATIONS BASED ON GEOID 2012A. US SURVEY FEET UNLESS SHOWN OTHERWISE.

-THERE ARE NO (0) WATER WELL(S) LOCATED WITHIN 250' OF WELL GRAGG 202.

-THERE ARE NO (0) DWELLINGS OR AGRICULTURAL STRUCTURES USED FOR HOUSING LIVESTOCK WITHIN 525' OF WELL GRAGG 202.

⊙ = MONUMENT FOUND IRON REBAR UNLESS NOTED OTHERWISE.

UT = UNNAMED TRIBUTARY

-THE LEASE BOUNDARIES COINCIDE WITH SURFACE PROPERTY LINES AS REPRESENTED.

1,527' TOP HOLE

797' BOTTOM HOLE

LATITUDE 39° 20' 00"

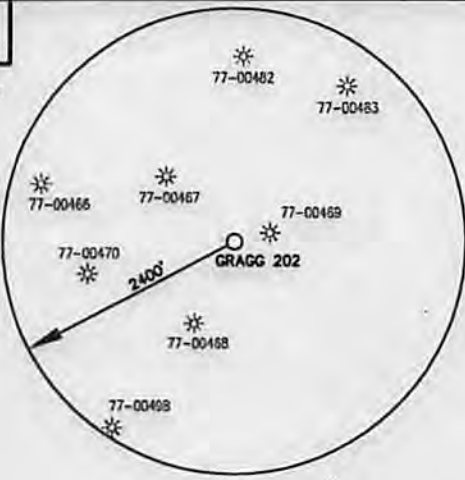


LONGITUDE 79° 52' 30"

6,012' BOTTOM HOLE

894' TOP HOLE

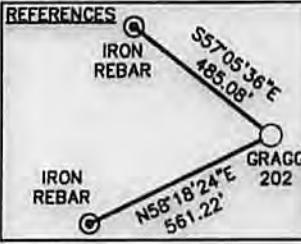
TM	PAR	OWNER
A	9	14.2 JAMES E. GRAGG
B	15	2 JOHN & LORETTA CLARKSON
C	15	3 WAYNE & GLORIA WAGNER
D	15	6 JOHN & LORETTA CLARKSON
E	15	7 WAYNE & GLORIA WAGNER



USER: elytle LAYOUT: 202 PLOT DATE/TIME: 7/11/2014 - 10:02am CAD FILE: L:\030-2476 - Mountaineer Keystone - Gragg Well Pad Survey\Gragg.dwg

L1 S67°35'32"W 1446.78'

T1 N19°48'58"E 1541.6'  
T2 N43°33'42"W 665.2'



TH BH DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAP

SURVEYED PROPERTY BOUNDARY  
500' BUFFER



Michael S. Wolf, P.S. 2270

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

FILE NO. 030-2476  
SCALE: 1"=2000'  
MINIMUM DEGREE OF ACCURACY: 1 in 2500  
PROVEN SOURCE OF ELEVATION: SURVEY GRADE GPS

STATE OF WEST VIRGINIA  
DIVISION OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL & GAS

DATE JULY 9, 2014  
OPERATOR'S WELL NO. MOUNTAINEER KEYSTONE GRAGG 202  
API WELL NO.  
47 - 077 - 00613 HGA  
STATE COUNTY PERMIT

WELL TYPE: OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  (IF "GAS"), PRODUCTION  STORAGE  DEEP  SHALLOW

LOCATION: ELEVATION: 1,500.0' WATER SHED: LITTLE SANDY CREEK  
DISTRICT: RENO COUNTY: PRESTON  
QUADRANGLE: THORNTON 7.5' ACREAGE: 120 AC±  
SURFACE OWNER: JAMES E. GRAGG LEASE ACREAGE: 498.46 AC+  
OIL & GAS ROYALTY OWNER(S): JAMES E. GRAGG/JOHN & LORETTA CLARKSON/WAYNE & GLORIA WAGNER  
LEASE NO. 040/046/577



PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
PERFORATE NEW FORMATION  PLUG OFF OLD FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_  
PLUG AND ABANDON \_\_\_\_\_ CLEAN OUT AND REPLUG \_\_\_\_\_  
TARGET FORMATION: MARCELLUS SHALE ESTIMATED DEPTH: 8,250' TVD / 14,148' MD

WELL OPERATOR: MOUNTAINEER KEYSTONE, LLC. DESIGNATED AGENT: NATHAN SKEEN  
ADDRESS: 1111 VAN VOORHIS ROAD, SUITE G ADDRESS: 1111 VAN VOORHIS ROAD, SUITE G  
MORGANTOWN, WV 26505 MORGANTOWN, WV 26505