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

February 26, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-5101702, issued to CHEVRON APPALACHIA, 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: BERGER 1H
Farm Name: BERGER, GARY & LINDA
API Well Number: 47-5101702
Permit Type: Horizontal 6A Well
Date Issued: 02/26/2014

Promoting a healthy environment.

API Number 051 01702

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 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.

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WW - 6B
(3/13)

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

1) Well Operator: Chevron Appalachia, LLC | 49449935 (Operator ID) | 51 (County) | Clay (District) | Glen Easton, WV 7.5' (Quadrangle)

2) Operator's Well Number: 1H Well Pad Name: Berger

3 Elevation, current ground: 1292' Elevation, proposed post-construction: 1292'

4) Well Type: (a) Gas ■ Oil _____ Underground Storage _____

Other _____

(b) If Gas: Shallow ■ Deep _____

Horizontal ■

5) Existing Pad? Yes or No: YES

SK 1/22/14
MDK 1/22/14

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
MARCELLUS, 6510'-6563', 53' anticipated thickness, o Marcellus 4249 psi; Utica 9760 psi

7) Proposed Total Vertical Depth: 6,538'

8) Formation at Total Vertical Depth: MARCELLUS

9) Proposed Total Measured Depth: 13,817'

10) Approximate Fresh Water Strata Depths: 165'

11) Method to Determine Fresh Water Depth: Local stream base, offset well data

12) Approximate Saltwater Depths: 2,565'

13) Approximate Coal Seam Depths: 825'

14) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: Ireland, 825'

16) Describe proposed well work: Drill 17-1/2" hole to 300' then run and cement 13-3/8" casing to surface covering the fresh water.
Drill 12.25" hole to 2,665' then run and cement to surface 9 5/8" casing, covering the Berea. Drill 8 1/2" hole to KOP at 5,764'. Drill 8 1/2" curve and lateral to 13,817' MD and 6,538 TVD. Run 5 1/2" production casing and cement back to surface. If a void is encountered: (see attachment)

17) Describe fracturing/stimulating methods in detail:
Complete, 4 of the Marcellus wells utilizing 300,000#s of 40/70 each and frac'd at 100 bpm.
Complete, 2 of the Marcellus wells utilizing utilizing 25,000#s 100 mesh, 125,000#s 40/70, and 300,000#s 30/50 sand meshes totaling 450,000#s of sand frac'd at 100 bpm.
Complete, 2 of the Marcellus wells utilizing utilizing 75,000#s 100 mesh, and 375,000#s 30/50 sand meshes totaling 450,000#s of sand frac'd at 100 bpm.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 23.4 ac.

19) Area to be disturbed for well pad only, less access road (acres): 2.2 ac.

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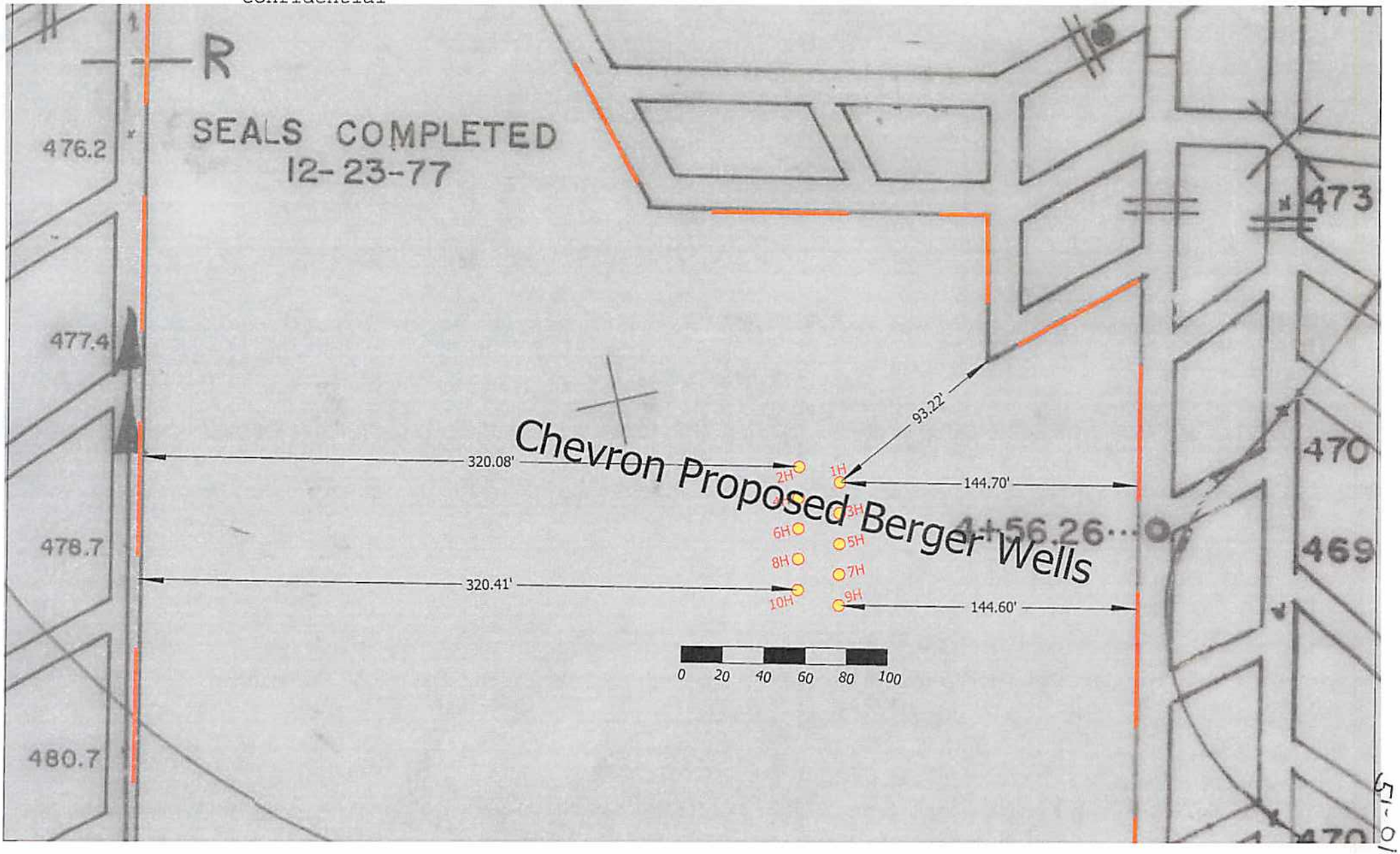
WW-6B Attachment Berger 2H, 4H, 5H, 6H, 8H, 9H, 10H, 1H

If a void is encountered the contingency will be the following:

- If a void is encountered drill 12-1/4" hole to 100' below bottom of void.
- Run 9-5/8", 36 lb/ft, J-55 casing with cement basket 20' above void.
- Cement casing using displacement method to bottom of void using 100 percent excess.
- Grout from surface to cement basket using whatever volume of cement is necessary to get cement to surface.
- Drill 8-3/4" hole to 2665'.
- Run 7", 23 lb/ft, N-80 casing.
- Cement casing to surface using the displacement method with 30% excess.
- Drill 6-1/4" hole to TD.
- Run 4-1/2" 13.5 lb/ft, P-110 casing to TD.
- Cement to surface using displacement method with 10% excess.

confidential



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20) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New			40'	40'	CTS
Fresh Water	13-3/8"	New	J-55	54.5#	300'	300'	CTS
Coal							
Intermediate	9-5/8"	New	N-80	40#	2,665'	2,665'	CTS
Production	5-1/2"	New	P-110	20#	13,817'	13,817'	CTS
Tubing							
Liners							

JLR 1/22/14
MJK 1/22/14

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	26"				
Fresh Water	13-3/8"	17-1/2"	0.380"	2,730 psi	Class A	1.18
Coal						
Intermediate	9-5/8"	12-1/4"	0.395"	5,750 psi	Class A	1.29
Production	5-1/2"	8-1/2"	0.361"	12,640 psi	Class A	2.2
Tubing						
Liners						

PACKERS

Kind:	None			
Sizes:				
Depths Set:				

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WW - 6B
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21) Describe centralizer placement for each casing string.

There will be a bow spring centralizer every two jts on the Water string and intermediate.
The production string will have two centralizer every jt in the lateral and curve, then one every two jts from KOP to surface.

22) Describe all cement additives associated with each cement type.

For the Water String the blend will contain class A cement, 3% CaCl2, and flake.
The intermediate will contain class A cement, 10% CaCl2, Salt, and flake
The Production cement will have a lead, middle, and tail cement.
The lead will contain class A cement, KCl, dispersant, suspension agent, and retarder.
The middle will contain class A cement, KCl, dispersant,Aluminum Silicate, suspension agent, and retarder.
The tail will contain class A cement, Calcium Carbonate, KCl, dispersant, de-foamer,suspension agent, and friction reducer

23) Proposed borehole conditioning procedures. Well will be circulated a minimum of 3 bottoms up once casing point has been reached on all hole sections and until uniform mud properties are achieved.

*Note: Attach additional sheets as needed.

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Cement Additives Berger Unit 1, 2, 4, 5, 6, 8, 9, 10

For the Water String the blend will contain class A cement, 3% CaCl2, and flake.

The intermediate will contain class A cement, 10% CaCl2, Salt, and flake.

The Production cement will have a lead, middle, and tail cement.

The lead will contain class A cement, KCl, dispersant, suspension agent, and retarder.

The middle will contain class A cement, KCl, dispersant,Aluminum Silicate, suspension agent, and retarder.

The tail will contain class A cement, Calcium Carbonate, KCl, dispersant, de-foamer,suspension agent, and friction reducer.

Cement Additives Berger Unit 3, 7

The Water String the blend will contain class A cement, 3% CaCl2, and flake.

The 1st intermediate will contain class A cement, 10% CaCl2, Salt, and flake.

The 2nd intermediate will have lead and tail cement. The lead will contain class G cement, Poz Mix, Latex, Friction reducer, defoamer, suspension agent, and 1% CaCl2. The Tail will contain class G cement and 1/2% CaCl2

The production will have a lead and tail cement. The lead will contain Class A cement, KCl, Fluid loss additive, suspension agent, and retarder. The tail will contain Class G cement, Calcium Carbonate, KCl, Fluid loss additive, Suspension Agent, and Retarder.

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Table Berger 3H and 7H

Casing Specifications	Approx. Shoe Depth	Cement (all strings to be cemented to surface)
30" plain end conductor	40'	Grout with Ready Mix
20"BTC (Water string)	500'	*Lafarge* Type 1 + 3% CaCl2 , ¼ lb/sk flake, 1.18 cf/sk, 15.6 ppg or equivalent
13 3/8", 72#, N-80, LTC 1st Intermediate	2665'	*Lafarge* Type 1 + 2% CaCl2 + 10% salt, ¼ lb/sk flake, 1.29 cf/sk, 15.7 ppg or equivalent
9-5/8", 53#, P-110, Buttress 2nd Intermediate	8650'	*Lafarge* Type 1 + 2% CaCl2 + 10% salt + retarder 1.29 cf/sk, 15.7 ppg or equivalent
5-1/2", 23#, P-110 HC, *VA Superior*	TD	Lead: *Lafarge*™ Type 1 25% Pozmix A, 0.6% Halad-567, 0.3% Silicalite, 0.1% HR-7, 0.15% HR-5 1.26 cf/sk, 14.2 ppg; Tail: *FRACCEM*™ 50% Calcium Carbonate, 0.8% Halad-567, 0.1% SA-1015, 0.6% HR-5 2.20 cf/sk, 15.2 ppg or equivalent

Table Berger 1H, 2H,4H, 5H, 6H, 8H, 9H, and 10H

Casing Specifications	Approx. Shoe Depth	Cement (all strings to be cemented to surface)
20" plain end conductor	40'	Grout with Ready Mix
13-3/8" 65# H-40 STC (Water string)	500'	*Lafarge* Type 1 + 3% CaCl2 , ¼ lb/sk flake, 1.18 cf/sk, 15.6 ppg or equivalent
9-5/8", 28#, N-80, STC Intermediate	2665'	*Lafarge* Type 1 + 2% CaCl2 + 10% salt, ¼ lb/sk flake, 1.29 cf/sk, 15.7 ppg or equivalent
5-1/2", 20#, P-110 HC, *VAM Top*	TD	Lead: *Lafarge*™ Type 1 25% Pozmix A, 0.6% Halad-567, 0.3% Silicalite, 0.1% HR-7, 0.15% HR-5 1.26 cf/sk, 14.2 ppg; Tail: *FRACCEM*™ 50% Calcium Carbonate, 0.8% Halad-567, 0.1% SA-1015, 0.6% HR-5 2.20 cf/sk, 15.2 ppg or equivalent

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Berger 1H

Marshall Co WV
2/6/2014

Casing & Cementing Details

Ground Level Elevation: 1,292' ft above SL
Depth meas. from KB: 0' ft above GL

		Casing Formation	DEPTH MD	DEPTH TVD	Inclination	HOLE SIZE	CASING SPECS	CEMENT INFO	GENERAL INFO
							Conductor		
		20" Conductor	40'				Minimum 40 ft from GL or at least 10 ft into bedrock		
Bow Spring: 1-shoe jt, 1-every 2nd jt 1 on ea 2-3 jts across previous shoe. Rigid: 2-within 100 ft of surface		Deepest Aquifer	165				**Surface String** **13-3/8" 54.5# J-55 BTC** **0.38" wall** Capacity = .1545bbl/ft Annulus = .1237 bbl/ft (+ 6 bbl for shoe track) Burst = 2730 psi	Cement to Surface	
		13 3/8" Casing	300'			17-1/2"	Minimum 35 ft - Optimum 50 ft past deepest coal		
Bow Spring: 1-shoe jt, 1-every 2nd jt 1 on ea 2-3 jts across previous shoe. Double-Bow: 2-within 100 ft of surface		Basket Top Coal Deepest Coal Red Beds Berea	780' 825' 835' 1,185' 2,565'				**Intermediate Casing** **9-5/8" 40# N-80 BTC** **8.835" ID - 8.679" DD** Capacity = .0758 bbl/ft Annulus = .0557 bbl/ft (+ 3.1 bbl for shoe track) Burst = 5750 psi Collapse = 3090 psi	Cement to Surface	
		9-5/8" Casing	2,665'			12-1/4"	Set below the Berea		
		KOP Burkett Sh. Tully Lm. Hamilton Sh. U. Marcellus Cherry Valley L. Marcellus Landing Point Basal Marcellus Onondaga	5,000' 7,181'	6,409' 6,510' 6,534' 6,536' 6,538' 6,558' 6,563'	0° 30° 45° 60° 80° 90°		**Prod. Casing** **5-1/2", 20#** **P-110, VAM Top** Capacity = .0221 bbl/ft (+1 bbl for shoe track) Burst = 12,640 psi Collapse = 11,080 psi ID = 4.778" Drift = 4.653" **Centralization** See Drilling Program • 1 Turbolator per joint for 3 joints above and 3 joints below 9-5/8" shoe • 2 double Bow Spring per 1 joint from top Marcellus to KOP • 2 SpiraGlider per joint from shoe to top of Marcellus	Cement to Surface	
		5-1/2" Casing	13,817'	6,538'	90°	6,636' 8-1/2"	45ft Shoe Track		

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51-01702

WW-9
(9/13)

API Number 47 - 51 - _____
Operator's Well No. Berger 1H

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Chevron Appalachia, LLC OP Code 4944935

Watershed (HUC 10) Middle Grave Creek- Grave Creek Quadrangle Powhatan, OH-WV 7.5'

Elevation 1287.49' County Marshall District Clay

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: N/A

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 _____

Will closed loop system be used? If so, describe: N/A

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. A combination of air, freshwater, KCl brine base foam, and

-If oil based, what type? Synthetic, petroleum, etc. Highly refined mineral oil based mud

Additives to be used in drilling medium? emulsifiers, wetting agents, organophillic clays, barite, calcium chloride (for internal phase of invert) gilsonite

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

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

-Landfill or offsite name/permit number? Arden Landfill- permit #- PA DEP 100172

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 Jeremy Hirtz

Company Official (Typed Name) Jeremy Hirtz

Company Official Title Permitting Team Lead

Subscribed and sworn before me this 27th day of September, 20 13

Rodney Lee Frazee Notary Public

My commission expires January 12, 2016

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Rodney Lee Frazee, Notary Public
Henry Clay Twp., Fayette County
My Commission Expires Jan. 12, 2016
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

51-01702

Form WW-9

Operator's Well No. Berger 1H

Chevron Appalachia, LLC

Proposed Revegetation Treatment: Acres Disturbed 21.2 Prevegetation pH 7

Lime 1 Tons/acre or to correct to pH 6.5-7

Fertilizer type 10-20-20

Fertilizer amount 1000 lbs/acre

Mulch 3 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Annual Ryegrass Mixture	48.4 lbs/acre	Perennial Ryegrass Mixture	435.6 lbs/acre
		Creeping Red Fescue or Chewings Fescue	
		Kentucky Bluegrass Mixture	

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: Gayne J Knitowski Jim Wakelane

Comments:

Title: Oil + Gas Inspector Inspector Date: 10/2/2013

Field Reviewed? (X) Yes ( ) No

51-01702

CHEVRON
APPALACHIA, LLC

West Virginia Well Site Safety Plan

Berger Site
Well 1H
Marshall County, West Virginia

MJK
10/2/2013
10/2/13

Prepared in Conformance with:

West Virginia's Code §22-6A, and Legislative Rules §35-8-3.4 and §35-8-5.7
and
West Virginia Department of Environmental Protection's, Office of Oil and Gas documents:
"Well Site Safety Plan Standards" (issued August 25, 2011), and
"Deep Well Drilling Procedures and Site Safety Plan Requirements" (issued October 22, 2012)

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Revision 1

Original: September 2012

Revised: June 2013

Water Management Plan:
Primary Water Sources

WMP-01629	API/ID Number:	047-051-01702	Operator:	Chevron Appalachia, LLC
		Berger 1H		

Important:

For each proposed primary water source (including source intakes for purchased water sources) identified in your water management plan, and summarized herein, DEP has made an evaluation concerning water availability over the specified date range. DEP's assessment is based on the following considerations:

- Statistical analysis of historical USGS stream gauge data (transferred to un-gauged locations as necessary);
- Identification of sensitive aquatic life (endangered species, mussels, etc.);
- Quantification of known existing demands on the water supply (Large Quantity Users);
- Minimum flows required by the Army Corps of Engineers; and
- Designated stream uses.

Based on these factors, DEP has provided, for each intake location (and origination point for purchased water), a reference gauge location and discharge flow reading which must be surpassed prior to withdrawals. Additionally, DEP has established a minimum passby flow at the withdrawal location which must also be surpassed prior to withdrawals. These thresholds are considered terms of the permit and are enforceable as such.

DEP is aware that some intake points will be used for mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

APPROVED DEC 0 9 2013

Source Summary

051 01702

WMP-01629	API Number:	047-051-01702	Operator:	Chevron Appalachia, LLC

Berger 1H

Stream/River

- Source **Grave Creek @ Cochran-Pearson Withdrawal Site** Marshall Owner: **Diana Lynn Cochran**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
4/25/2014	4/25/2015	8,500,000		39.905103	-80.757019

☑ Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999999 Ohio River Station: Willow Island Lock & Dam

Max. Pump rate (gpm): **1,200** **Min. Gauge Reading (cfs):** **6,468.00** **Min. Passby (cfs)**

DEP Comments: Refer to the specified sation on the National Weather Service's Ohio River forecasts at the following website: http://www.erh.noaa.gov/ohrfc//flows.shtml

Source Detail

051 01702

WMP-01629 API/ID Number: 047-051-01702 Operator: Chevron Appalachia, LLC

Berger 1H

Source ID: 30436 Source Name: Grave Creek @ Cochran-Pearson Withdrawal Site

Diana Lynn Cochran

Source Latitude: 39.905103

Source Longitude: -80.757019

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 25000 County: Marshall

Anticipated withdrawal start date: 4/25/2014

Anticipated withdrawal end date: 4/25/2015

Total Volume from Source (gal): 8,500,000

Max. Pump rate (gpm): 1,200

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

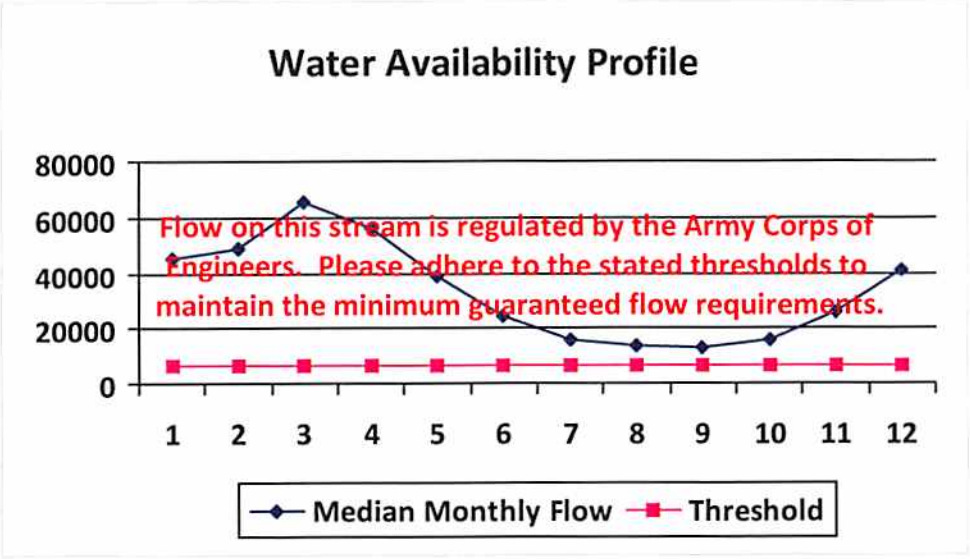
- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? Ohio River Min. Flow
- [ ] Proximate PSD?
- [x] Gauged Stream?

Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

Drainage Area (sq. mi.) 25,000.00

Gauge Threshold (cfs): 6468

Month	Median monthly flow (cfs)	Threshold (+ pump	Estimated Available water (cfs)
1	45,700.00	-	-
2	49,200.00	-	-
3	65,700.00	-	-
4	56,100.00	-	-
5	38,700.00	-	-
6	24,300.00	-	-
7	16,000.00	-	-
8	13,400.00	-	-
9	12,800.00	-	-
10	15,500.00	-	-
11	26,300.00	-	-
12	41,300.00	-	-



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	2.67
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	-
Passby at Location (cfs):	-

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

051 01702

Water Management Plan:
Secondary Water Sources

WMP- 01629	API/ID Number	047-051-01702	Operator:	Chevron Appalachia, LLC
		Berger 1H		

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Purchased Water

Source ID:	30437	Source Name	Southwestern Pennsylvania Water Authority Public Water Provider	Source start date: Source end date:	4/25/2014 4/25/2015
Source Lat:		Source Long:		County	
Max. Daily Purchase (gal)	100,000	Total Volume from Source (gal):	8,500,000		
DEP Comments:	Please ensure that purchases from this provider are in accordance with the terms established by PADEP in WMP-279986-5.				

Important:

For each proposed secondary water source identified in your water management plan (i.e., groundwater well, lake/reservoir, recycled frac water, multi-site impoundment, out-of-state source), DEP makes no estimation of the availability of water. These sources may prove to be unsuitable water supplies. Please review the following notes:

- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the drinking well owner prior to operation of the water supply well.
- For each proposed multi-site impoundment water source identified in your water management plan (if applicable), DEP will review the withdrawal limits established in the referenced Water Management Plan for current suitability and provide to the operator these limits for each identified intake. Note that withdrawal limits may be modified as necessary based on changing demands upon that water supply.

Source ID: 30438 Source Name: North Fayette Water Authority - Oliverio
Public Water Provider

Source start date: 4/25/2014
Source end date: 4/25/2015

Source Lat: Source Long: County

Max. Daily Purchase (gal): 100,000 Total Volume from Source (gal): 8,500,000

DEP Comments: Please ensure that purchases from this provider are in accordance with the terms established by PADEP in WMP-279986-5.

Source ID: 30439 Source Name: North Fayette Water Authority - Mt. Braddock
Public Water Provider

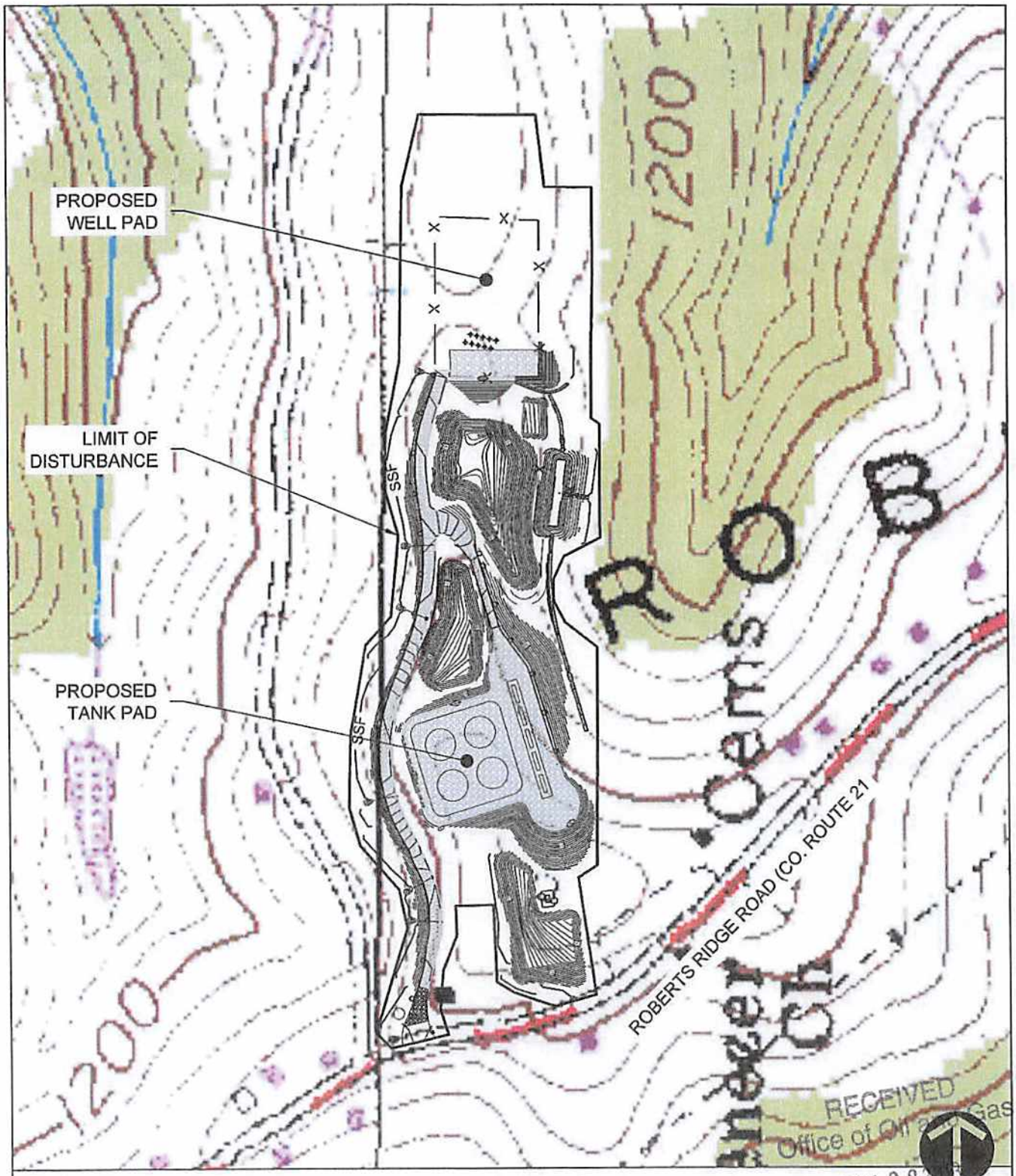
Source start date: 4/25/2014
Source end date: 4/25/2015

Source Lat: Source Long: County

Max. Daily Purchase (gal): 100,000 Total Volume from Source (gal): 8,500,000

DEP Comments: Please ensure that purchases from this provider are in accordance with the terms established by PADEP in WMP-279986-5.

51-01702



RECEIVED
Office of Oil and Gas
OCT 28
WV Department of Environmental Protection

SITE USGS LOCATION MAP
POWHATAN POINT AND BUSINESSBURG USGS QUADS
SCALE: 1" = 300'

USGS SITE LOCATION MAP	BERGER WELLS AND TANK PAD ROBERTS RIDGE ROAD (CO. ROUTE 21), CLAY DISTRICT MARSHALL COUNTY, WEST VIRGINIA	Date	No	REVISION RECORD
Project Number: C-17544-0300 Drawing Scale: 1"=300' Date Issued: SEPT 2013 Index Number: -- Drawn By: CRJ Checked By: PJS Project Manager: JDW	PREPARED FOR: CHEVRON APPALACHIA, LLC 800 MOUNTAIN VIEW DRIVE SMITHFIELD, PA 15478	-	01	-
		-	02	-
		-	03	-
		-	04	-
		-	05	-
		-	06	-
		-	07	-
		-	08	-

FIG-1

GATEWAY
On Call. On Time. On Target.

Consulting Engineers & Surveyors
400 Holiday Drive, Suite 300 Pittsburgh, PA 15220
Phone (412) 921-4030 - Fax (412) 921-9960
• Butler, PA (724) 287-1088 • Washington, PA (724) 229-3362
http://www.gateway-engineers.com Copyright ©2013 Gateway Engineers Inc. All Rights Reserved

Path & Filename: G:\Projects\17000\17544 Atlas Energy\-0300 Berger Wells\Dwg\03-Sheet\USGS+E&S Exhibit.dwg
Plot Date= 9/24/2013 4:36 PM Joseph M. Gallinath Save Date= 9/24/2013 4:35 PM

Well is located on topo map 124' feet south of Latitude: 39°52'30"

Well is located on topo map 1261' feet west of Longitude: 80°45'00"

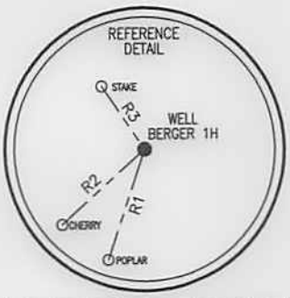
SURFACE HOLE LOCATION (SHL)	APPROX. LANDING POINT	BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83	UTM 17-NAD83	UTM 17-NAD83
N:4413872.10	N:4413946.64	N:4412343.40
E:520992.07	E:521258.49	E:522490.51
NAD83, WV NORTH	NAD83, WV NORTH	NAD83, WV NORTH
N:503146.05	N:503376.03	N:498047.45
E:1616416.54	E:1617294.86	E:1621249.89

LEGEND

- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED.
- WATER SOURCE
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE

WELLS WITHIN 3000'

- EXISTING WELLS
- PLUGGED WELLS



PARCEL	LESSOR
A	GARY & LINDA BERGER
B	TERRY L. PATTERSON
C	STANLEY L. & SHIRLEY L. PATTERSON
D	GEORGE E. & REBECCA VUCELICK
E	WILLIAM T. & MONICA BONAR
F	WILLIAM T. & MONICA BONAR
G	CLARA E. HAMMOND
H	JOHN ROBERT BONAR
I	PURPLEBURGH VENTURES, LLC
J	GRACE L. & JOHN ROBERT BONAR

LINE	BEARING	DISTANCE
R1	S 18°51'00" W	264.07'
R2	S 48°30'45" W	255.26'
R3	N 34°23'04" W	172.88'
R4	S 76°40'46" W	1303.13'
R5	S 65°59'24" W	1243.90'
R6	S 35°55'44" E	1000.33'

NOTES:

1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

Blue Mountain Inc.
11023 MASON DIXON HIGHWAY
BURTON, WV 26562
PHONE: (304) 662-6486

FILE #: BERGER 1H

DRAWING #: BERGER 1H

SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/2500

PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

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 REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: [signature]

R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX LICENSED No. 2000 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

STATE OF WEST VIRGINIA

DATE: JANUARY 29, 2014

OPERATOR'S WELL #: BERGER 1H

API WELL #: 47 (STATE) 51 (COUNTY) 01702H6A (PERMIT)

Well Type: ☐ Oil ☐ Waste Disposal ☒ Production ☐ Deep
☒ Gas ☐ Liquid Injection ☐ Storage ☒ Shallow

WATERSHED: MIDDLE GRAVE CREEK - GRAVE CREEK ELEVATION: 1287.49'

COUNTY/DISTRICT: MARSHALL / CLAY QUADRANGLE: POWHATAN, OH-WV 7.5'

SURFACE OWNER: GARY & LINDA BERGER ACREAGE: 51.753±

OIL & GAS ROYALTY OWNER: GARY & LINDA BERGER ACREAGE: 542.505±

DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☐

PLUG OFF OLD FORMATION ☐ PERFORATE NEW FORMATION ☐ PLUG & ABANDON ☐

CLEAN OUT & REPLUG ☐ OTHER CHANGE ☐ (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,538'± TMD: 13,817'±

WELL OPERATOR CHEVRON APPALACHIA, LLC DESIGNATED AGENT KENNETH E. TAWNEY

Address 800 MOUNTAIN VIEW DRIVE Address 500 LEE STREET, EAST SUITE 1600

City SMITHFIELD State PA Zip Code 15478 City CHARLESTON State WV Zip Code 25301-3202