



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

October 11, 2013

WELL WORK PERMIT

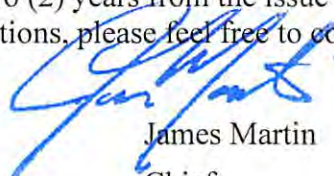
Horizontal 6A Well

This permit, API Well Number: 47-10302916, issued to CHESAPEAKE APPALACHIA, L.L.C., 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: WILLIAM RITCHEA WTZ 6H
Farm Name: RITCHEA, WILLIAM D. & SHIRLI
API Well Number: 47-10302916
Permit Type: Horizontal 6A Well
Date Issued: 10/11/2013

Promoting a healthy environment.

10/11/2013

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.

103-02916

WW - 6B
(3/13)

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

1) Well Operator: Chesapeake Appalachia, LLC 494477557 103-Wetzel 7-Proctor 681-Wileyville
Operator ID County District Quadrangle

2) Operator's Well Number: William Ritchea WTZ 6H Well Pad Name: William Ritchea WTZ Pad

3 Elevation, current ground: 1586' Elevation, proposed post-construction: 1560'

4) Well Type: (a) Gas Oil Underground Storage
Other _____
(b) If Gas: Shallow _____ Deep _____
Horizontal

5) Existing Pad? Yes or No: No.

DATA
6-3-13

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Target Formation- Marcellus, Target Top TVD- 7495', Target Base TVD- 7545', Anticipated Thickness- 50, Associated Pressure- 4721

7) Proposed Total Vertical Depth: 7,525'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 16,100'

10) Approximate Fresh Water Strata Depths: 551'

11) Method to Determine Fresh Water Depth: Data was gathered from e-logs, drillers logs and from wells within a 2500' radius.

12) Approximate Saltwater Depths: 2,484'

13) Approximate Coal Seam Depths: 1,436'

14) Approximate Depth to Possible Void (coal mine, karst, other): None that we are aware of. ✓

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No.

16) Describe proposed well work: Drill and stimulate and potential zones between and including the Benson to the Marcellus. **If we should encounter a void place basket above and below void area- balance cement to bottom of void and grout from basket to surface. Run casing not less than 20' below void nor more than 50' below void. (*If freshwater is encountered deeper than anticipated it must be protected, set casing 50' below and cts)

17) Describe fracturing/stimulating methods in detail:
Well will be perforated within the target formation and stimulated with a slurry of water, sand, and chemical additives at a high rate. This will be performed in stages with the plug and perf method along the wellbore until the entire lateral has been stimulated within the target formation. All stage plugs are then drilled out and the well is flowed back to surface. The well is produced through surface facilities consisting of high pressure production units, vertical separation units, water and oil storage tanks.

Received

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): JUN 13.0 7 2013

19) Area to be disturbed for well pad only, less access road (acres): 10.3

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WW - 6B
(3/13)

20)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill -up (Cu. Ft.)</u>
Conductor	20"	New	J-55	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	J-55	54.5#	701'	701'	650 sx/CTS
Coal	9 5/8"	New	J-55	40#	3,086'	3,086'	1,170 sx/CTS
Intermediate	7"	New	P-110	20#	If Needed	If Needed	If needed/As Possible
Production	5 1/2"	New	P-110	20#	16,100'	16,100'	Lead 1150sx Tail 1480sx/100' inside intermediate
Tubing	2 3/8"	New	N-80	4.7#	Approx. 7,424'	Approx. 7,424'	
Liners							

Dm4 6-3-13

<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</u>
Conductor	20"	30"	0.25	2120	15.6 ppg	1.19/50% Excess
Fresh Water	13 3/8"	17.5"	0.380	2740	15.6 ppg	1.19/50% Excess
Coal	9 5/8"	12 1/4"	0.395	3950	15.6 ppg	1.19/50% Excess
Intermediate	7"	8 3/4"	.0317	4360	15.6 ppg	1.20/15% Excess
Production	5 1/2"	8 3/4"	0.361	12360	15.6 ppg	1.20/15% Excess
Tubing	2 3/8"	4.778"	0.190			
Liners						

PACKERS

Kind:	10K Arrowset AS1-X		
Sizes:	5 1/2"		
Depths Set:	Approx. 6,197'		

Received

JUN 7 2013

21) Describe centralizer placement for each casing string.
at a minimum of 1 per every 3 joints of casing.

All casing strings will be ran with a centralizer

22) Describe all cement additives associated with each cement type.
for Chemical Listing of Cement & Additives for Chesapeake Energy wells.

**Please see attached sheets

23) Proposed borehole conditioning procedures.

rotation for a minimum of one bottoms up and continuing until operator is satisfied with borehole conditions.

*Note: Attach additional sheets as needed.

Dmlt
6-3-13

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JUN 7 2013

Office of Oil and Gas
WV Dept. of Environmental Protection

103-02916

<u>Chemical Name</u>	<u>CAS Number</u>	<u>% Concentration Used</u>
Fuller's earth (attapulgitite)	8031-18-3	0.2% BWOC
Polypropylene glycol	25322-69-4	
polyethylene terephthalate	25038-59-9	0.125 lb/sk
✓ calcium chloride	10043-52-4	2% BWOC
polyethylene terephthalate	25038-59-9	1 lb/bbl
bentonite	1302-78-9	20 lb/bbl
Fuller's earth (attapulgitite)	8031-18-3	0.2% BWOC
Polypropylene glycol	25322-69-4	
polyethylene terephthalate	25038-59-9	0.125 lb/sk
sodium chloride	7647-14-5	10% BWOW
chrySTALLine silica	14808-60-7	0.15% BWOC
bentonite	1302-78-9	20 lb/bbl
polyethylene terephthalate	25038-59-9	1 lb/bbl
product classified as non-hazardous.		0.05 gal/sk
product classified as non-hazardous		0.01 gal/sk
polypropylene glycol	25322-69-4	0.02 gal/sk
Carbohydrate	proprietary	1 lb/bbl
Silica Organic Polymer	proprietary	0.1 gal/bbl
barium sulfate	7727-43-7	310 lb/bbl
fatty acid amine	proprietary	
ethoxylated alcohol	proprietary	
glycerol	56-81-5	
2,2'-Iminodiethanol	111-42-2	1 gal/bbl
aliphatic amide polymer	proprietary	0.35% BWOC
non-crystalline silica	7631-86-9	6% BWOC
boric acid	10043-35-3	0.8% BWOC
Fuller's earth (attapulgitite)	8031-18-3	
Polypropylene glycol	25322-69-4	0.2% BWOC
chrySTALLine silica	14808-60-7	
metal oxide	proprietary	0.2% BWOC
sulphonated synthetic polymer	proprietary	
formaldehyde (impurity)	50-00-0	0.3% BWOC
Fuller's earth (attapulgitite)	8031-18-3	
Polypropylene glycol	25322-69-4	0.2% BWOC
aliphatic amide polymer	proprietary	0.35% BWOC
Sodium Polynaphthalene Sulfonate	9008-63-3	
Sodium Sulfate	7757-82-6	0.25% BWOC

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 WV Dept. of Environmental Protection
 Office of Oil and Gas

DMH
 6-3-13

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103-02916

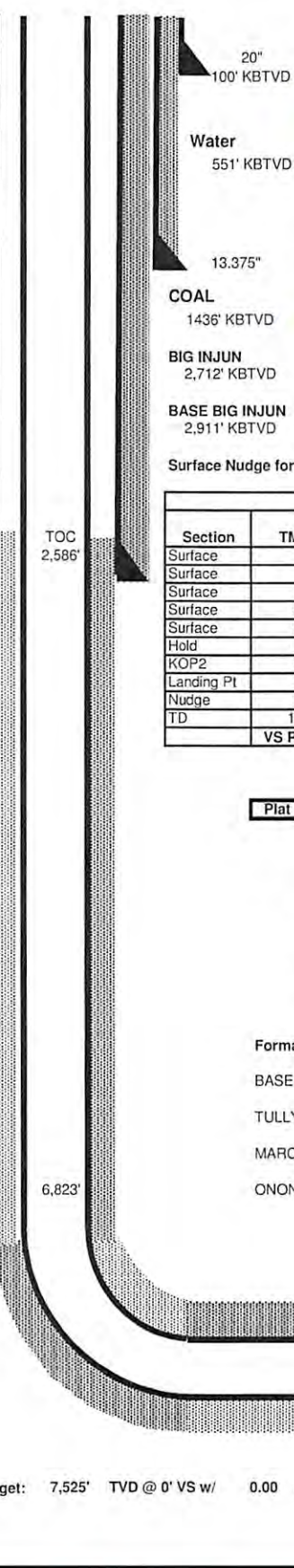
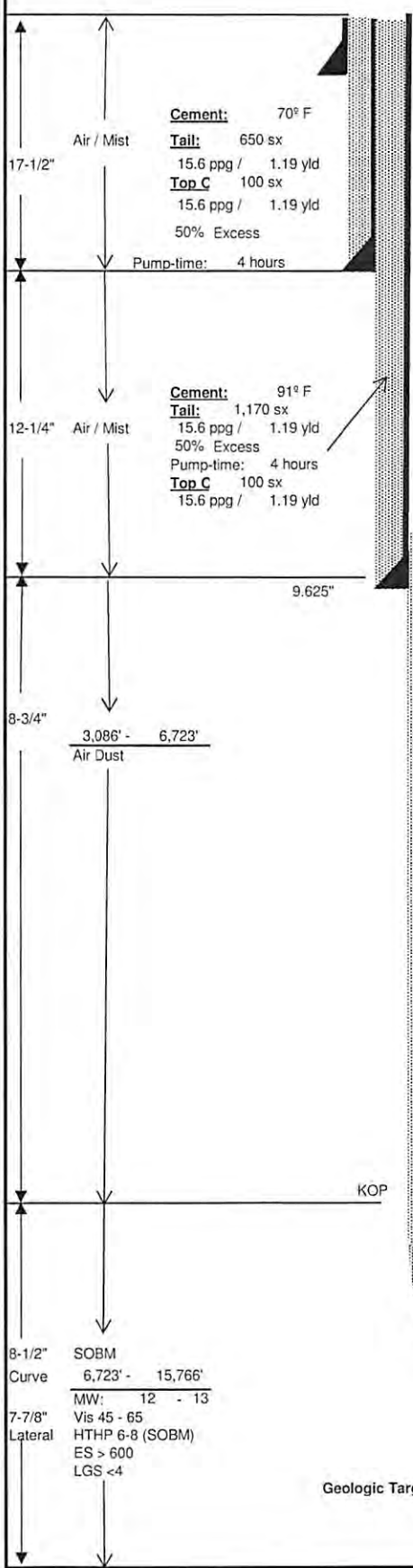
chrystalline silica	14808-60-7	
metal oxide	proprietary	0.2% BWOC
chrystalline silica	14808-60-7	0.2% BWOC
Carbohydrate	proprietary	proprietary
Silica Organic Polymer	proprietary	proprietary
barium sulfate	7727-43-7	7727-43-7
fatty acid amine	proprietary	proprietary
ethoxylated alcohol	proprietary	proprietary
glycerol	56-81-5	56-81-5
2.2'-Iminodiethanol	111-42-2	111-42-2

DMH
6-3-17

Received
JUN 7 2013
Office of Oil and Gas
WV Dept. of Environmental Protection

10/11/2013

		Well Name: William Ritchea Wtz 6H	Drilling Rig: N/A
			Directional Drilling: N/A
Drilling Engineer: TBD	Formation: Marcellus		Drilling Mud: N/A
Superintendent: N/A	County, State: Wetzel, WV		Cement Surface: N/A
Asset Manager: N/A	Surface Latitude: 39.669460	Surface Longitude: -80.659485	Cement Longstrings: N/A
Geologist: N/A	BH Latitude: 39.652957	BH Longitude: -80.645134	Wellhead: N/A
Land: N/A	KB Elevation: 1606'	Ground Elevation: 1586'	AFE #: N/A



Wellhead Equipment	
Tree Description	
Tubing Head **	Blanking Cap
'B' Section	11" x 5M x 7-1/16" 10M
'A' Section	9-5/8" SOW x 11" 5M

** Space out such that Blanking Cap is no more than 30" above grade.

Casing Detail						
	Size	Wt	Grd	Conn.	From:	To:
Surface	13.375	54.5 #	J-55	STC	0'	701'
Interm	9.625	40 #	J-55	LTC	0'	3,086'
Prod	5.5	20 #	P-110	GBCD	0'	15,766'

Report any water or gas flows. Catch liquid sample if possible.

Casing Design						
	Size	ID	Coll	Burst	Tens	MU torq
Surface	13.375	12.615	1130	2740	514	5140
Interm	9.625	8.835	2570	3950	520	5200
Prod	5.5	4.778	12200	12360	641	8530

Surface Nudge for Anti-Collision purposes.

Directional Drilling Details								
Section	TMD	Inc.	Azimuth	TVD	BUR	DLS	+N/-S	+E/-W
Surface	0.00'	0.00	0.00	0.00'	0.00	0.00	0.0'	0.0'
Surface	800'	0.00	0.00	800'	0.00	0.00	0.0'	0.0'
Surface	1,300'	10.00	243.40	1,297'	2.00	2.00	-19.5'	-38.9'
Surface	2,500'	10.00	243.40	2,479'	0.00	0.00	-112.8'	-225.2'
Surface	3,000'	0.00	0.00	2,977'	-2.00	2.00	-132.3'	-264.2'
Hold	6,823'	0.00	0.00	6,800'	0.00	0.00	-132.3'	-264.2'
KOP2	7,421'	71.71	261.03	7,253'	12.00	12.00	-183.4'	-587.8'
Landing Pt	7,424'	71.71	261.03	7,254'	0.00	0.00	-183.8'	-590.3'
Nudge	8,441'	90.00	137.00	7,525'	1.80	12.00	-942.8'	-811.2'
TD	15,766'	90.00	137.00	7,525'	0.00	0.00	-6,299.7'	4,184.3'
	VS Plane	137.00					VS Length	7,461.00'

Lateral Length ==> 8,342.20'

Plat Date 3/14/13

Logging Program		
Run	Log Type	Interval
1	TBD	TBD
2	TBD	TBD

Mudlogger operational at Surface

Formation Depths (TVD)	
BASE BIG INJUN	2,911'
TULLY	7,372'
MARCELLUS	7,501'
ONONDAGA	7,551'

Cement: 129° F
 Lead: 1,150 sx
 15.6 ppg / 1.20 yld
 Tail: 1,430 sx
 15.6 ppg / 1.20 yld
 15% Excess
 Pump-time: 6 hours

PBHL 5.5"
 TMD: 15,766'
 TVD: 7,525'
 Inclination: 90.00 deg

Geologic Target: 7,525' TVD @ 0° VS w/ 0.00 degrees/100 ft Up-dip

10/11/2013

Gyro the 1st well on the pad at KOP. Ensure all Surveys are referenced to Grid North!!

Drawn by: **TBD**
 Date: **10/1/2013**

Office of Mineral Resources

OCT 03 2013

Department of Environmental Protection

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Chesapeake Appalachia, LLC OP Code 494477557

Watershed (HUC 10) Middle Ohio North Quadrangle 681-Wileyville

Elevation 1586' County 103-Weztel District 7-Proctor

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

Will a pit be used for drill cuttings? Yes xx No _____

If so, please describe anticipated pit waste: _____

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

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
 - Underground Injection (UIC Permit Number 2D0072539/ 2D0413175/ 2D0610306/ 2D0610317)
 - Reuse (at API Number at next anticipated well, API# will be included with the WR-34/DDMR &/or permit addendum)
 - Off Site Disposal (Supply form WW-9 for disposal location)
 - Other (Explain Flow back fluids will be put in steel tanks and reused or taken to a permitted disposal facility.)

Will closed loop system be used? Yes

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Air and salt saturate mud

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

Additives to be used in drilling medium? see attached sheets

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) _____

-Landfill or offsite name/permit number? Meadowfill SWF-1032, SS Grading SWF-4902 Northwestern SWF-1025 Short Creek 1034/WV0109517 / CID28726 Arden Landfill 1001712

Carbon Limestone 28726/CID 28726, American 02-12954, Country Wide 38392/CID 38390, Pine Grove 13688

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 _____

Company Official (Typed Name) Danielle Southall

Company Official Title Regulatory Analyst II

Office of Oil and Gas
WV Dept. of Environmental Protection

Subscribed and sworn before me this 3rd day of May

Brittany R Woody
My commission expires 11/27/23



Chesapeake Appalachia, LLC

103-02914

Proposed Revegetation Treatment: Acres Disturbed 10+/- Prevegetation pH _____

Lime as determined by pH test min. 2 _____ Tons/acre or to correct to pH 6.5

Fertilizer (10-20-20 or equivalent) 500 lbs/acre (500 lbs minimum)

Mulch Hay/Straw 2.5 Tons/acre

Seed Mixtures

Area I		Area II	
Seed Type	lbs/acre	Seed Type	lbs/acre
White Clover	15	White Top	15
Red Top	15	Red Top	15
Orchard Grass	20	Orchard Grass	20

Attach:
Drawing(s) of road, location, pit and proposed area for land application.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [Signature]

Comments: _____

Received

Title: Oil and Gas Inspector

Date: 6-3-13 JUN 7 2013

Field Reviewed? Yes No



Water Management Plan: Primary Water Sources



WMP- 01396

API/ID Number: 047-103-02916

Operator:

Chesapeake Energy

William Ritchea WTZ 6H

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 multiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interpreted 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 AUG 23 2013

Source Summary

WMP- 01396

API Number: 047-103-02916

Operator: Chesapeake Energy

William Ritchea WTZ 6H

Stream/River

● Source **Ohio River WP 1 (Beech Bottom Staging Area)** Brooke Owner: **Brownlee Land Ventures**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
10/1/2013	10/1/2014	4,032,000		40.226889	-80.658972

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

Max. Pump rate (gpm): **6,000** Min. Gauge Reading (cfs): **6,468.00** Min. Passby (cfs)

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>

● Source **Little Wheeling Creek WP 1 (Rt. 40 Staging Area)** Ohio Owner: **JDS Investments, LLC**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
10/1/2013	10/1/2014	4,032,000		40.078324	-80.591145

Regulated Stream? Ref. Gauge ID: 3112000 WHEELING CREEK AT ELM GROVE, WV

Max. Pump rate (gpm): **2,000** Min. Gauge Reading (cfs): **64.80** Min. Passby (cfs) **2.83**

DEP Comments:

10/11/2013

Source Summary

WMP-01396

API Number: 047-103-02916

Operator: Chesapeake Energy

William Ritchea WTZ 6H

Purchased Water

● Source **The Village of Valley Grove** Ohio Owner: **The Village of Valley Grove**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
10/1/2013	10/1/2014	4,032,000	720,000	-	-

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

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

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>

● Source **Ohio County PSD** Ohio Owner: **Ohio county PSD**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
10/1/2013	10/1/2014	4,032,000	720,000	-	-

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

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

DEP Comments: Refer to the specified station on the National Weather Service's Ohio River forecast website: <http://www.erh.noaa.gov/ohrfc//flows.shtml>

10/11/2013

Source Detail

WMP-01396

API/ID Number: 047-103-02916

Operator: Chesapeake Energy

William Ritchea WTZ 6H

Source ID: 23085 Source Name: The Village of Valley Grove
The Village of Valley Grove

Source Latitude: -
Source Longitude: -

HUC-8 Code: 5030106

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

Anticipated withdrawal start date: 10/1/2013

Anticipated withdrawal end date: 10/1/2014

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 4,032,000

Trout Stream? Tier 3?

Max. Pump rate (gpm):

Regulated Stream? Ohio River Min. Flow

Max. Simultaneous Trucks:

Proximate PSD? Wheeling Water Department

Max. Truck pump rate (gpm):

Gauged Stream?

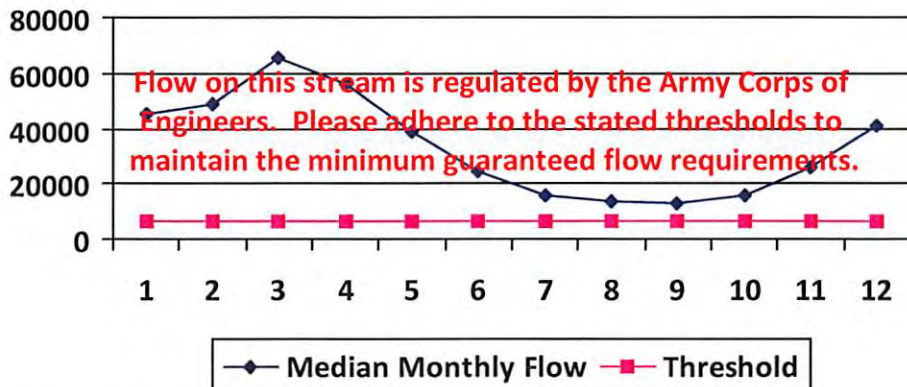
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

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 Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

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.

10/11/2013

Source Detail

WMP- 01396

API/ID Number: 047-103-02916

Operator:

Chesapeake Energy

William Ritchea WTZ 6H

Source ID: 23086 Source Name: Ohio County PSD
Ohio county PSD

Source Latitude: -
Source Longitude: -

HUC-8 Code: 5030106

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

Anticipated withdrawal start date: 10/1/2013

Anticipated withdrawal end date: 10/1/2014

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 4,032,000

Trout Stream? Tier 3?

Max. Pump rate (gpm):

Regulated Stream? Ohio River Min. Flow

Max. Simultaneous Trucks:

Proximate PSD? Wheeling Water Department

Max. Truck pump rate (gpm):

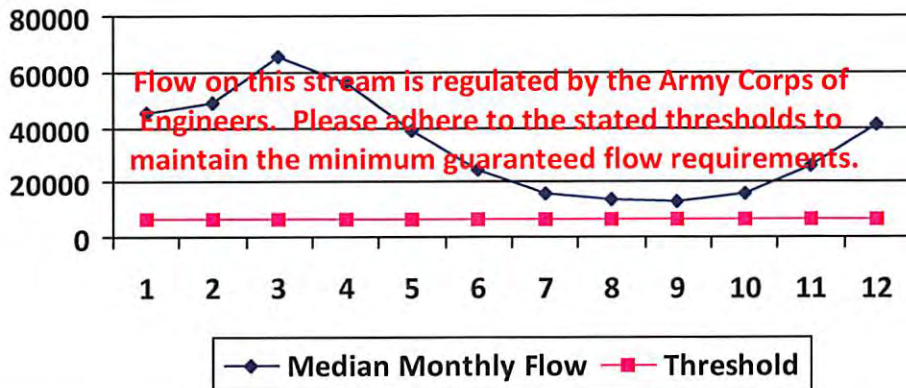
Gauged Stream?

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 Profile



Water Availability Assessment of Location

Base Threshold (cfs): -

Upstream Demand (cfs):

Downstream Demand (cfs):

Pump rate (cfs):

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.

10/11/2013

Source Detail

WMP- 01396

API/ID Number: 047-103-02916

Operator:

Chesapeake Energy

William Ritchea WTZ 6H

Source ID: 23082 Source Name: Ohio River WP 1 (Beech Bottom Staging Area)
Brownlee Land Ventures

Source Latitude: 40.226889

Source Longitude: -80.658972

HUC-8 Code: 5030106

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

Anticipated withdrawal start date: 10/1/2013

Anticipated withdrawal end date: 10/1/2014

Endangered Species? Mussel Stream?

Trout Stream? Tier 3?

Total Volume from Source (gal): 4,032,000

Regulated Stream? Ohio River Min. Flow

Max. Pump rate (gpm): 6,000

Proximate PSD? Beech Bottom Water Dept.

Max. Simultaneous Trucks: 0

Gauged Stream?

Max. Truck pump rate (gpm): 0

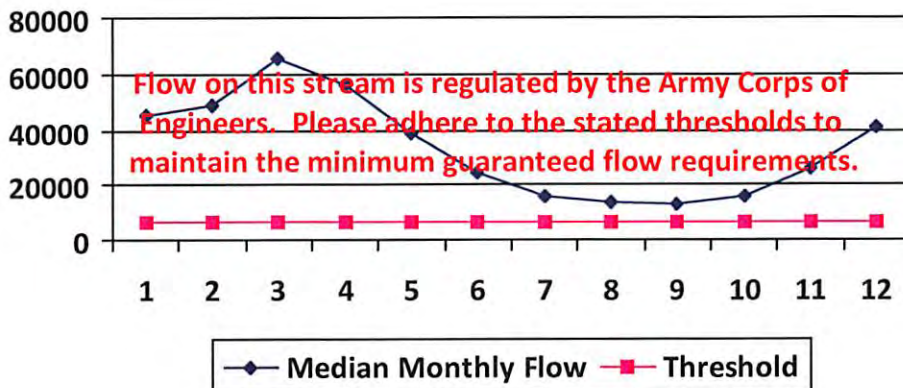
Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

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 Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	-
Downstream Demand (cfs):	-
Pump rate (cfs):	13.37
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.

Source Detail

WMP- 01396

API/ID Number: 047-103-02916

Operator:

Chesapeake Energy

William Ritchea WTZ 6H

Source ID: 23083 Source Name: Little Wheeling Creek WP 1 (Rt. 40 Staging Area)
 JDS Investments, LLC

Source Latitude: 40.078324

Source Longitude: -80.591145

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 13.94 County: Ohio

Anticipated withdrawal start date: 10/1/2013

Anticipated withdrawal end date: 10/1/2014

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 4,032,000

Trout Stream? Tier 3?

Max. Pump rate (gpm): 2,000

Regulated Stream?

Max. Simultaneous Trucks:

Proximate PSD?

Max. Truck pump rate (gpm)

Gauged Stream?

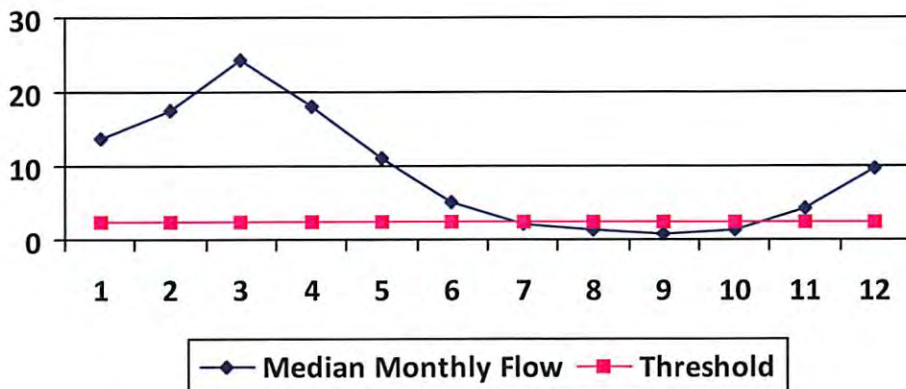
Reference Gaug: 3112000 WHEELING CREEK AT ELM GROVE, WV

Drainage Area (sq. mi.): 281.00

Gauge Threshold (cfs): 38

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	13.81	10.62	3.55
2	17.62	10.62	7.36
3	24.44	10.62	14.18
4	18.14	10.62	7.88
5	11.06	10.62	0.80
6	5.03	10.62	-5.23
7	2.22	10.62	-8.03
8	1.30	10.62	-8.96
9	0.83	10.62	-9.43
10	1.37	10.62	-8.89
11	4.31	10.62	-5.95
12	9.77	10.62	-0.49

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	1.89
Upstream Demand (cfs):	3.34
Downstream Demand (cfs):	0.00
Pump rate (cfs):	4.46
Headwater Safety (cfs):	0.47
Ungauged Stream Safety (cfs):	0.47
Min. Gauge Reading (cfs):	64.80
Passby at Location (cfs):	2.83

"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.



Water Management Plan: Secondary Water Sources



WMP- 01396

API/ID Number: 047-103-02916

Operator:

Chesapeake Energy

William Ritchea WTZ 6H

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.

Multi-site impoundment

Source ID:	23087	Source Name	Schostag Freshwater Impoundment (Chesapeake En Industrial Facility)		Source start date:	10/1/2013
					Source end date:	10/1/2014
Source Lat:	39.72385	Source Long:	-80.664395	County	Marshall	
Max. Daily Purchase (gal)	864,000	Total Volume from Source (gal):	4,032,000			

DEP Comments:

The intake identified above has been defined in a previous water management plan. The thresholds established in that plan govern this water management plan unless otherwise noted.

Reference: WMP-77

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.

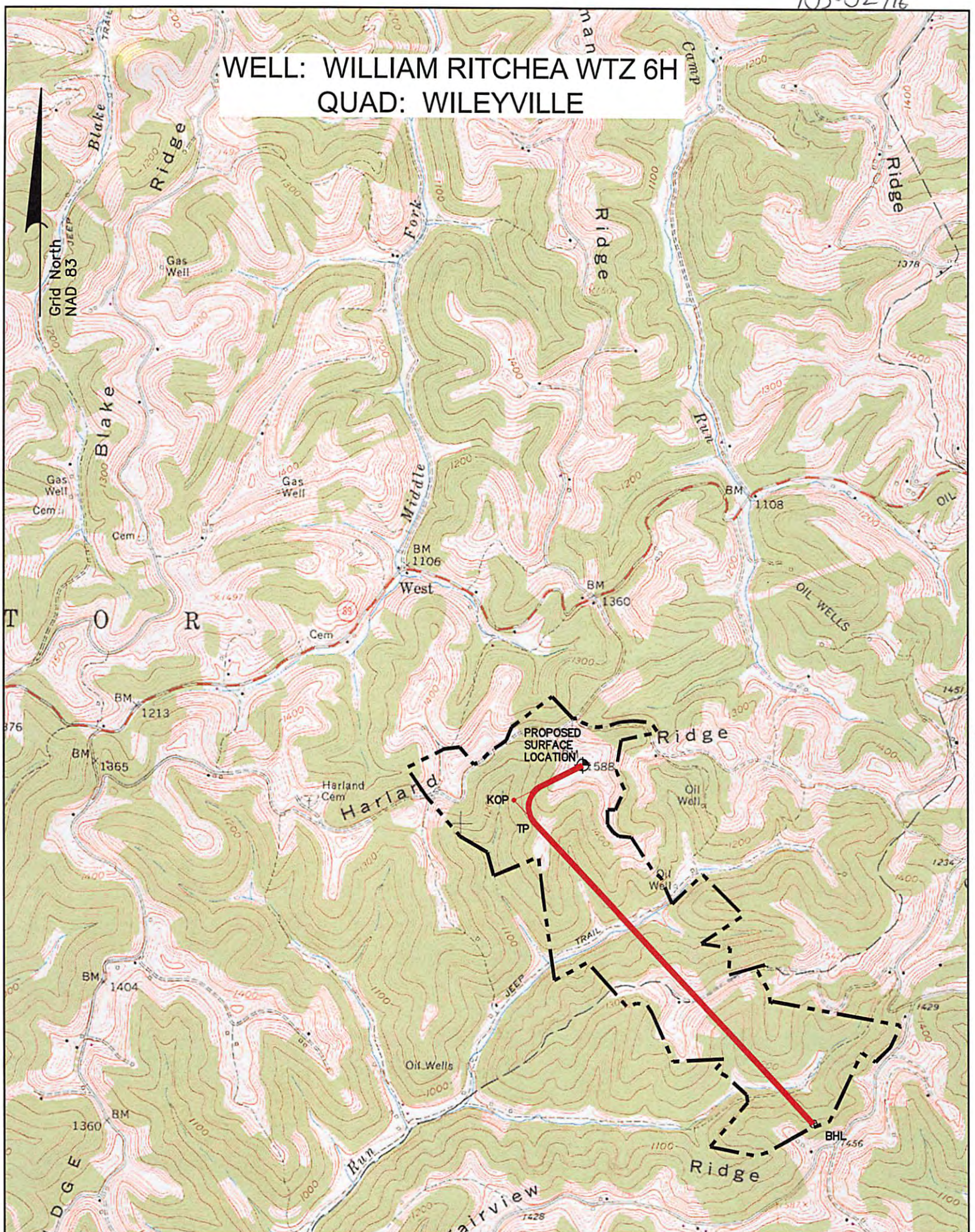
Purchased Water

Source ID: 23084	Source Name	Pennsylvania American Water Public Water Provider	Source start date:	10/1/2013
			Source end date:	10/1/2014
	Source Lat:	Source Long:	County	
	Max. Daily Purchase (gal)	720,000	Total Volume from Source (gal):	4,032,000
DEP Comments:	Please ensure that the sourcing of this water confirms to all rules and guidance provided by PA DEP.			

Recycled Frac Water

Source ID: 23088	Source Name	Van Aston MSH 10H	Source start date:	10/1/2013
			Source end date:	10/1/2014
	Source Lat:	Source Long:	County	
	Max. Daily Purchase (gal)		Total Volume from Source (gal):	1,008,000
DEP Comments:				

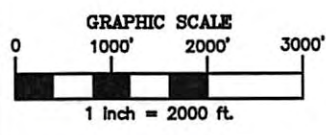
WELL: WILLIAM RITCHEA WTZ 6H
QUAD: WILEYVILLE



LEGEND

- PROPOSED GAS WELL
- BOTTOM HOLE LOCATION
- PROPOSED BORE
- EXTERNAL LEASE LINE

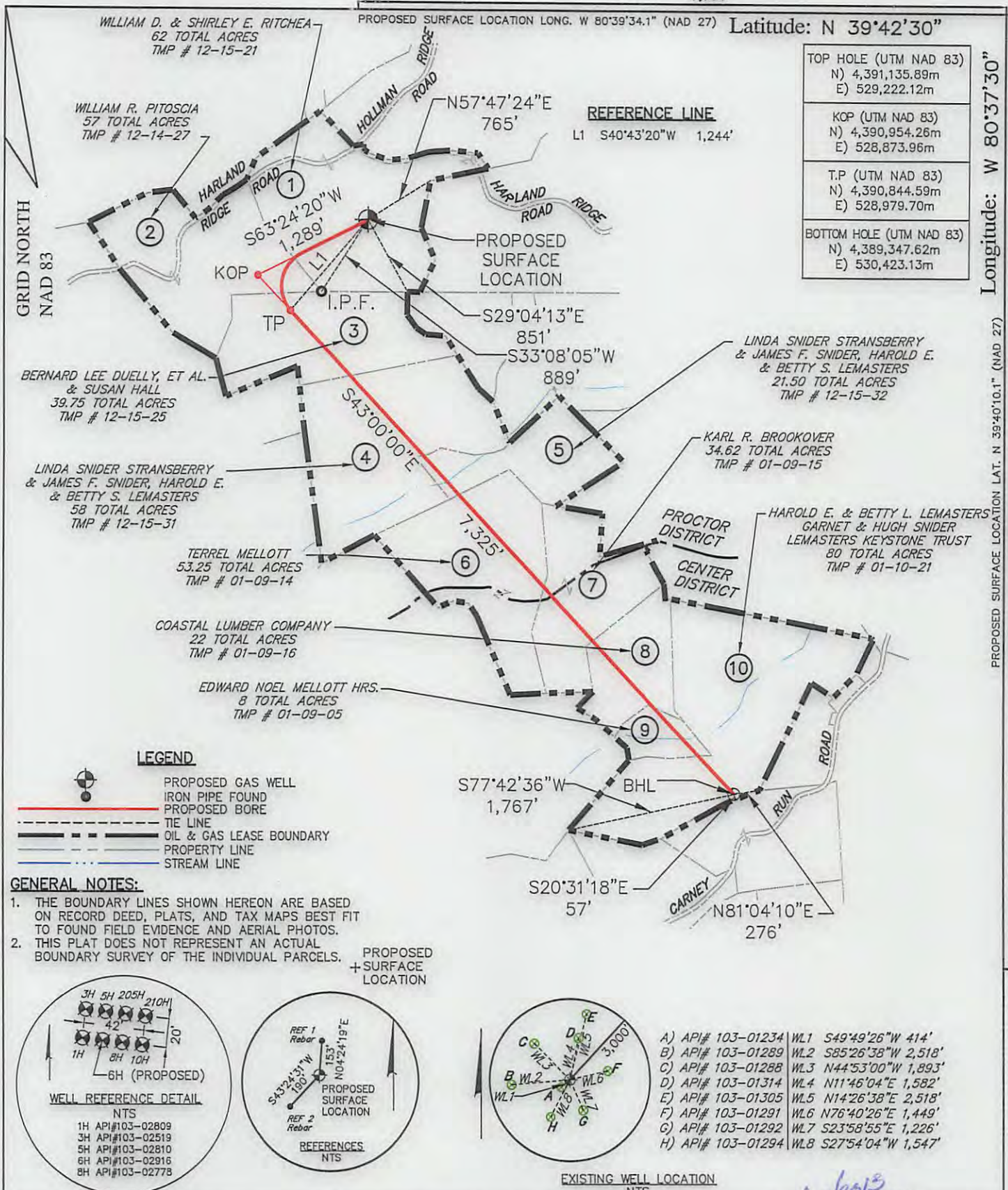
NOTE:
 THE PURPOSE OF THIS PLAT IS FOR THE LOCATION OF PROPOSED GAS WELLS AND DOES NOT REPRESENT A CLOSED BOUNDARY SURVEY. PROPERTY LINES AND OWNERS WERE OBTAINED FROM VARIOUS FIELD EVIDENCE, TAX RECORDS AND AERIAL MAPPING.



TOP HOLE (NAD 83) N) 428,086.4' E) 1,642,176.2' LAT.) 39°40'10.3" LONG.) 80°39'33.5" DEC. LAT.) 39.669540° DEC. LONG.) 80.659296°	KOP (NAD 83) N) 427,509.4' E) 1,641,023.7' LAT.) 39°40'04.5" LONG.) 80°39'48.1" DEC. LAT.) 39.667915° DEC. LONG.) 80.663363°	TURNING POINT (NAD 83) N) 427,143.8' E) 1,641,364.7' LAT.) 39°40'00.9" LONG.) 80°39'43.7" DEC. LAT.) 39.666923° DEC. LONG.) 80.662135°	BOTTOM HOLE (NAD 83) N) 422,152.4' E) 1,646,019.2' LAT.) 39°39'12.2" LONG.) 80°38'43.4" DEC. LAT.) 39.653385° DEC. LONG.) 80.645376°
TOP HOLE (NAD 27) N) 428,049.6' E) 1,673,614.3' LAT.) 39°40'10.1" LONG.) 80°39'34.1" DEC. LAT.) 39.669460° DEC. LONG.) 80.659485°	KOP (NAD 27) N) 427,472.6' E) 1,672,461.9' LAT.) 39°40'04.2" LONG.) 80°39'48.8" DEC. LAT.) 39.667835° DEC. LONG.) 80.663551°	TURNING POINT (NAD 27) N) 427,107.0' E) 1,672,802.9' LAT.) 39°40'00.6" LONG.) 80°39'44.4" DEC. LAT.) 39.666843° DEC. LONG.) 80.662323°	BOTTOM HOLE (NAD 27) N) 422,115.5' E) 1,677,457.5' LAT.) 39°39'11.9" LONG.) 80°38'43.2" DEC. LAT.) 39.653305° DEC. LONG.) 80.645564°
TOP HOLE (UTM NAD 83) N) 4,391,135.89m E) 529,222.12m	KOP (UTM NAD 83) N) 4,390,954.26m E) 528,873.96m	T.P (UTM NAD 83) N) 4,390,844.59m E) 528,979.70m	BOTTOM HOLE (UTM NAD 83) N) 4,389,347.62m E) 530,423.13m

REGISTRATION of
 WV Department of
 Environmental Protection
 03/11/2013

Applicant / Well Operator Name CHESAPEAKE APPALACHIA, LLC	Well(Farm) Name WILLIAM RITCHEA WTZ	Well # 6H	Serial #
Address PO BOX 18496 OKLAHOMA CITY, OK 73154-0496	County - Code WETZEL - 103	District PROCTOR	
Surface Landowner / Lessor WILLIAM D. & SHIRLEY E. RITCHEA	USGS 71/2 Quadrangle Map Name WILEYVILLE		



TOP HOLE (UTM NAD 83)	N) 4,391,135.89m E) 529,222.12m
KOP (UTM NAD 83)	N) 4,390,954.26m E) 528,873.96m
T.P (UTM NAD 83)	N) 4,390,844.59m E) 528,979.70m
BOTTOM HOLE (UTM NAD 83)	N) 4,389,347.62m E) 530,423.13m

Longitude: W 80°37'30"

PROPOSED SURFACE LOCATION LAT. N 39°40'10.1" (NAD 27)

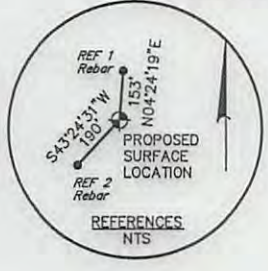
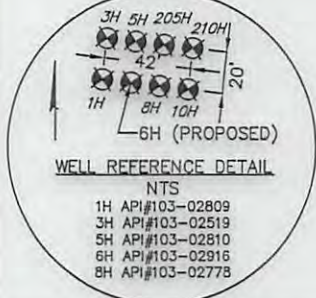
LEGEND

- PROPOSED GAS WELL
- IRON PIPE FOUND
- PROPOSED BORE
- TIE LINE
- OIL & GAS LEASE BOUNDARY
- PROPERTY LINE
- STREAM LINE

GENERAL NOTES:

1. THE BOUNDARY LINES SHOWN HEREON ARE BASED ON RECORD DEED, PLATS, AND TAX MAPS BEST FIT TO FOUND FIELD EVIDENCE AND AERIAL PHOTOS.
2. THIS PLAT DOES NOT REPRESENT AN ACTUAL BOUNDARY SURVEY OF THE INDIVIDUAL PARCELS.

PROPOSED SURFACE LOCATION



- A) API# 103-01234 WL1 S49°49'26"W 414'
- B) API# 103-01289 WL2 S85°26'38"W 2,518'
- C) API# 103-01288 WL3 N44°53'00"W 1,893'
- D) API# 103-01314 WL4 N11°46'04"E 1,582'
- E) API# 103-01305 WL5 N14°26'38"E 2,518'
- F) API# 103-01291 WL6 N76°40'26"E 1,449'
- G) API# 103-01292 WL7 S23°58'55"E 1,226'
- H) API# 103-01294 WL8 S27°54'04"W 1,547'

FILE #: 08541-8003

DRAWING #: 08541-8003_Well Plat

SCALE: PLAT: 1" = 1,400'
TICK: 1" = 2,000'

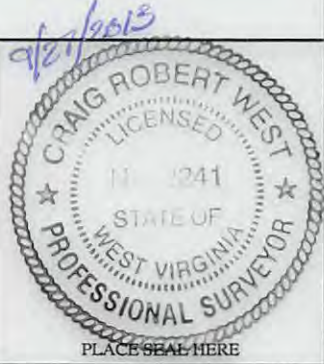
MINIMUM DEGREE OF ACCURACY: 1/200

PROVEN SOURCE OF ELEVATION: NGS (CORS)

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.

SIGNED: [Signature]

R.P.E.: _____ L.L.S.: 2241



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



DATE: SEPTEMBER 27, 2013

OPERATOR'S WELL #: WILLIAM RITCHEA WIZ 6H

API WELL #: 47 103 02916 H6A

STATE COUNTY PERMIT

WELL TYPE: OIL GAS WASTE DISPOSAL LIQUID INJECTION PRODUCTION STORAGE DEEP SHALLOW

WATERSHED: MIDDLE OHIO NORTH ELEVATION: 1,586'

COUNTY/DISTRICT: WETZEL / PROCTOR QUADRANGLE: WILEYVILLE

SURFACE OWNER: WILLIAM D. & SHIRLEY E. RITCHEA ACREAGE: 62± ACRES

OIL & GAS ROYALTY OWNER: _____ ACREAGE: _____

CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PERFORATE NEW FORMATION PLUG & ABANDON

DRILL PLUG OFF OLD FORMATION CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TMD: 15,441' TVD: 7,525'

WELL OPERATOR: CHESAPEAKE APPALACHIA, LLC DESIGNATED AGENT: ERIC B. GILLESPIE

ADDRESS: P.O. BOX 18496 ADDRESS: P.O. BOX 6070

CITY: OKLAHOMA CITY STATE: OK ZIP CODE: 73154-0496 CITY: CHARLESTON STATE: WV ZIP CODE: 25362

10/11/2013