



**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 20, 2014

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-5101729, 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: CHARLES YOHO MSH 6H  
Farm Name: YOHO, DOROTHY L.

**API Well Number: 47-5101729**

**Permit Type: Horizontal 6A Well**

Date Issued: 02/20/2014

**Promoting a healthy environment.**

**02/21/2014**

## PERMIT CONDITIONS

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

### CONDITIONS

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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.

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

453

1) Well Operator: Chesapeake Appalachia, LLC 49447757 51- Marshall 9- Webster Majorsville  
Operator ID County District Quadrangle

2) Operator's Well Number: Charles Yoho MSH 6H Well Pad Name: Charles Yoho MSH Pad

3 Elevation, current ground: 1330' Elevation, proposed post-construction: 1332'

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

Other \_\_\_\_\_  
(b) If Gas: Shallow  Deep   
Horizontal \_\_\_\_\_

5) Existing Pad? Yes or No: No

*DJK 10/24/2013* *JL 12/24/13*

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Target formation- Marcellus Target top TVD- 6,639' Target base TVD- 6,683' Anticipated thickness- 44' Associated Pressure- 4448

7) Proposed Total Vertical Depth: 6,661'

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 13,600'

10) Approximate Fresh Water Strata Depths: 439'

11) Method to Determine Fresh Water Depth: from analysis of water wells in the area.

12) Approximate Saltwater Depths: 1400'

13) Approximate Coal Seam Depths: 891'

14) Approximate Depth to Possible Void (coal mine, karst, other): 460' Possible Void.

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 any 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.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 10.9

19) Area to be disturbed for well pad only, less access road (acres): 8.7

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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	J-55	94#	100'	100'	CTS
Fresh Water	13 3/8"	New	J-55	54.5#	941'	941'	860 sx/CTS
Coal	9 5/8"	New	J-55	40#	2,330'	2,330'	850 sx/CTS
Intermediate	7"	New	P-110	20#	If Needed	If Needed	If needed/As Needed
Production	5 1/2"	New	P-110	20#	13,600'	13,600'	Lead 1,050lx Tail 1,620sx/100' Inside Intermediate
Tubing	2 3/8"	New	N-80	4.7#	Approx. 7,007'	Approx. 7,007'	
Liners							

*MSK 10/24/2013*

*sh 10/24/13*

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
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"	0.317	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'		

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21) Describe centralizer placement for each casing string. \_\_\_\_\_

All casing strings will be ran with a centralizer at a minimum of 1 per every 3 joints of casing.

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

\*\*Please see attached sheets for Chemical Listing of Cement & Additives for Chesapeake Energy wells.

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23) Proposed borehole conditioning procedures. \_\_\_\_\_

All boreholes will be conditioned with circulation and rotation for a minimum of one bottoms up and continuing until operator is satisfied with borehole conditions.

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\*Note: Attach additional sheets as needed.

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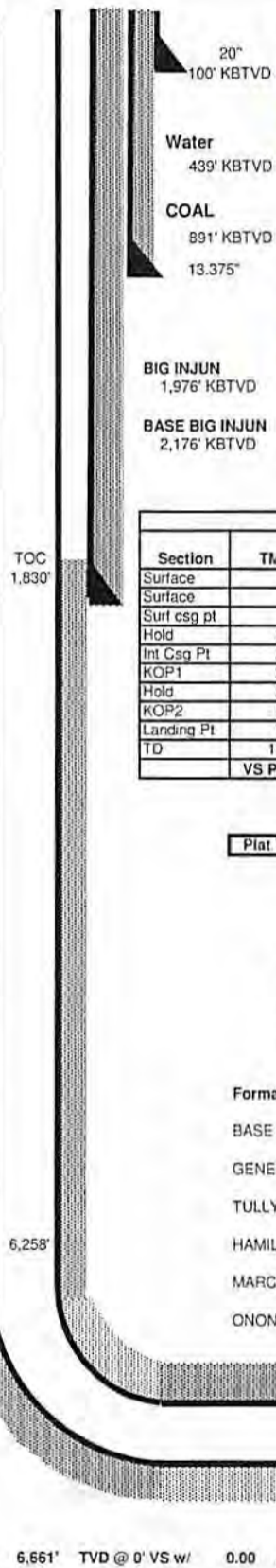
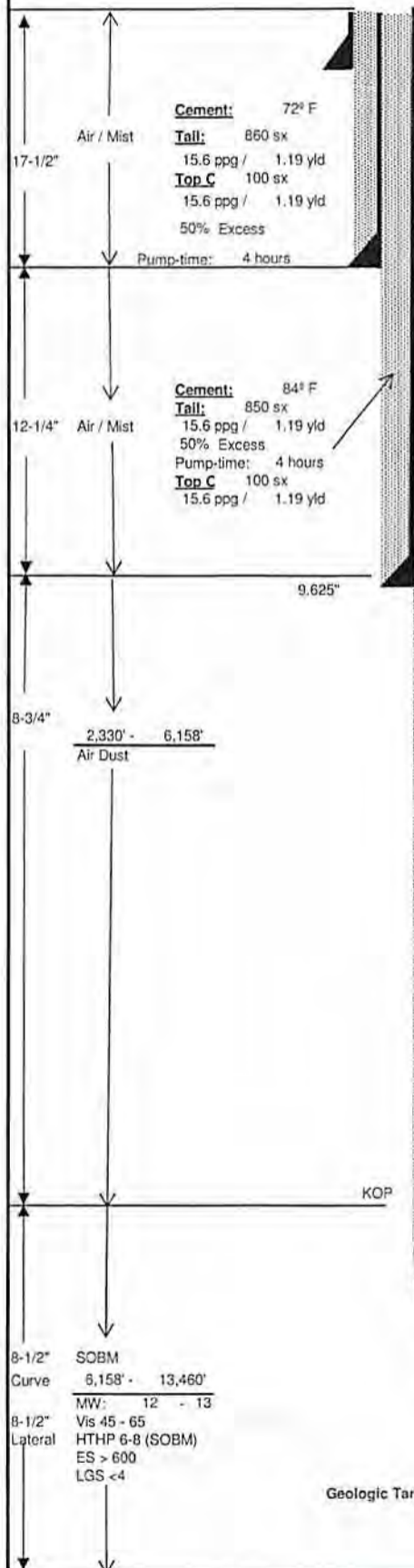
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SLB Cement Additives

	Product Name	Product Use	Chemical Name	CAS Number	% Concentration Used
Surface	D046	antifoam	Fuller's earth (attapulgitite)	8031-18-3	0.2% BWOC
			Polypropylene glycol	25322-69-4	
	D130	polyester flake - lcm	polyethylene terephthalate	25038-59-9	0.125 lb/sk
	S001	calcium chloride	calcium chloride	10043-52-4	2% BWOC
		SPACER			
		D130	polyester flake - lcm	polyethylene terephthalate	25038-59-9
	D020	bentonite extender	bentonite	1302-78-9	20 lb/bbl
Intermediate	D046	antifoam	Fuller's earth (attapulgitite)	8031-18-3	0.2% BWOC
			Polypropylene glycol	25322-69-4	
	D130	polyester flake - lcm	polyethylene terephthalate	25038-59-9	0.125 lb/sk
	D044	granulated salt	sodium chloride	7647-14-5	10% BWOW
	D153	Anti-Settling Agent	chrystalline silica	14808-60-7	0.15% BWOC
		SPACER			
	D020	bentonite extender	bentonite	1302-78-9	20 lb/bbl
	D130	polyester flake - lcm	polyethylene terephthalate	25038-59-9	1 lb/bbl
Kick Off Plug	D080	cement liquid dispersant	product classified as non-hazardous		0.05 gal/sk
	D801	mid-temp retarder	product classified as non-hazardous		0.01 gal/sk
	D047	antifoam agent	polypropylene glycol	25322-69-4	0.02 gal/sk
		SPACER			
	B389	MUDPUSH* Express	Carbohydrate	proprietary	1 lb/bbl
	D206	Antifoaming Agent	Silica Organic Polymer	proprietary	0.1 gal/bbl
	D031	bante	barium sulfate	7727-43-7	310 lb/bbl
			fatty acid amine	proprietary	
			ethoxylated alcohol	proprietary	
	B220	surfactant	glycerol 2,2'-Iminodiethanol	56-81-5 111-42-2	1 gal/bbl
Production - Lined	D167	UNIFLAC* S	aliphatic amide polymer	proprietary	0.35% BWOC
	D154	low-temperature extender	non-crystalline silica	7631-86-9	6% BWOC
	D400	EasyBLOK	boric acid	10043-35-3	0.8% BWOC
	D046	antifoam	Fuller's earth (attapulgitite)	8031-18-3	
			Polypropylene glycol	25322-69-4	0.2% BWOC
	D201	basic cements enabler	chrystalline silica metal oxide	14808-60-7 proprietary	0.2% BWOC
	D202	low-temperature solid dispersant	sulphonated synthetic polymer formaldehyde (impurity)	proprietary 50-00-0	0.3% BWOC
	D046	antifoam	Fuller's earth (attapulgitite)	8031-18-3	
			Polypropylene glycol	25322-69-4	0.2% BWOC
	D167	UNIFLAC* S	aliphatic amide polymer	proprietary	0.35% BWOC
	D065	TIC* Dispersant	Sodium Polynaphthalene Sulfonate	9008-63-3	
			Sodium Sulfate	7757-82-6	0.25% BWOC
	D201	basic cements enabler	chrystalline silica metal oxide	14808-60-7 proprietary	0.2% BWOC
	D153	Anti-Settling Agent	chrystalline silica	14808-60-7	0.2% BWOC
		SPACER			
	B389	MUDPUSH* Express	Carbohydrate	proprietary	proprietary
	D206	Antifoaming Agent	Silica Organic Polymer	proprietary	proprietary
	D031	bante	barium sulfate	7727-43-7	7727-43-7
			fatty acid amine	proprietary	proprietary
			ethoxylated alcohol	proprietary	proprietary
B220	surfactant	glycerol 2,2'-Iminodiethanol	56-81-5 111-42-2	56-81-5 111-42-2	

\*\*\*Ref. 2013-78

	Well Name:	Charles Yoho MSH 6H		Drilling Rig:	N/A
	Drilling Engineer:	TBD	Formation:	Marcellus	Directional Drilling:
Superintendent:	N/A	County, State:	Marshall, WV	Drilling Mud:	N/A
Asset Manager:	N/A	Surface Latitude:	39.917026	Surface Longitude:	-80.617213
Geologist:	N/A	BH Latitude:	39.900259	BH Longitude:	-80.609388
Land:	N/A	KB Elevation:	1351'	Ground Elevation:	1331'
				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'	941'
Interm	9.625	40 #	J-55	LTC	0'	2,330'
Prod	5.5	20 #	P-110	GBCD	0'	13,460'

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

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	100'	0.00	0.00	100'	0.00	0.00	0.0'	0.0'
Surf csg pt	941'	0.00	0.00	941'	0.00	0.00	0.0'	0.0'
Hold	2,000'	0.00	0.00	2,000'	0.00	0.00	0.0'	0.0'
Int Csg Pt	2,330'	0.00	0.00	2,330'	0.00	0.00	0.0'	0.0'
KOP1	2,430'	0.00	0.00	2,430'	0.00	0.00	0.0'	0.0'
Hold	2,983'	11.06	243.01	2,980'	2.00	2.00	-24.2'	-47.4'
KOP2	6,258'	11.06	243.01	6,194'	0.00	0.00	-309.3'	+607.3'
Landing Pt	7,007'	90.00	154.10	6,661'	10.55	12.00	-778.7'	-480.8'
TD	13,460'	90.00	154.10	6,661'	0.00	0.00	-6,584.2'	2,338.2'
VS Plane	154.10						VS Length	6,944.15'

Lateral Length ==> 6,453.70'

Plat Date: 10/3/13

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

Mudlogger operational at: Surface

Formation Depths (TVD)

BASE BIG INJUN	2,176'
GENESECO	6,487'
TULLY	6,509'
HAMILTON	6,537'
MARCELLUS	6,637'
ONONDAGA	6,681'

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Cement: 122° F  
Lead: 1,050 sx  
15.6 ppg / 1.20 yld  
Tall: 1,620 sx  
15.6 ppg / 1.20 yld  
15% Excess  
Pump-time: 6 hours

Geologic Target: 6,661' TVD @ 0° VS w/ 0.00 degrees/100 ft Up-dip

PBHL: 5.5"  
TMD: 13,460'  
TVD: 6,661'  
Inclination: 90.00 deg

02/21/2014

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

Drawn by: TBD  
Date: 10/14/2013

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 49447757

Watershed (HUC 10) Wheeling Creek Quadrangle Majorsville

Elevation 1330' County 51- Marshall District 9- Webster

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

Will a pit be used for drill cuttings? Yes No x

If so, please describe anticipated pit waste: Closed loop system in place at this time- cuttings will be taken to a permitted landfill.

Will a synthetic liner be used in the pit? Yes No x 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/CID28720, Carbon Limestone 28726/CID 28728

Arden Landfill 10072, American 02-12954, Country Wide 38390/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 [Signature]

Company Official (Typed Name) Danielle Southall

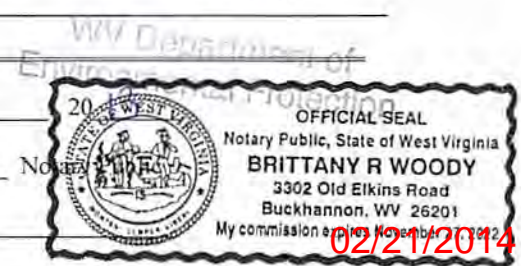
Company Official Title Regulatory Analyst

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Subscribed and sworn before me this 18th day of September

Brittany R Woody

My commission expires 11/27/22





051 01729

Form WW-9

Operator's Well No. Charles Yoho MSH 6H

Chesapeake Appalachia, LLC

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

Seed Type	Area I	lbs/acre	Seed Type	Area II	lbs/acre
White Clover		15	White Clover		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: [Signatures]

Comments:

Title: Oil and Gas Inspector

Date: 10/24/2013

Field Reviewed? (X) Yes ( ) No

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02/21/2014


**Marcellus Well Drilling Procedures  
And Site Safety Plan**

Chesapeake Appalachia, LLC

47 - 51 - **01729**

Well name: Charles Yoho MSH 6H  
Majorsville, Quad  
Webster, District  
Marshall County, West Virginia

*MSJK*  
*10/24/2013*  
*Ju*  
*10/24/13*

Submitted by:  Date: 9/18/2013  
Danielle Southall Title Regulatory Analyst Chesapeake Appalachia, LLC

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Title: \_\_\_\_\_  
Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Title: \_\_\_\_\_

Chesapeake Appalachia, L.L.C. – Confidential

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## Water Management Plan: Primary Water Sources



WMP-01695

API/ID Number: 047-051-01729

Operator:

Chesapeake Energy

Charles Yoho MSH 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](mailto:DEP.water.use@wv.gov).

APPROVED DEC 12 2013 --

Source Summary

051 01729

WMP- 01695

API Number: 047-051-01729

Operator: Chesapeake Energy

Charles Yoho MSH 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:
2/1/2014 2/1/2015 6,000,000 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:
2/1/2014 2/1/2015 6,000,000 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:

02/21/2014

Source Summary

051 01729  
Chesapeake Energy

WMP- 01695

API Number:

047-051-01729

Operator:

Charles Yoho MSH 6H

Purchased Water

Source **Ohio River @ J&R Excavating** Marshall Owner: **J&R Excavating**

Start Date End Date Total Volume (gal) Max. daily purchase (gal) Intake Latitude: Intake Longitude:  
2/1/2014 2/1/2015 6,000,000 1,890,000 39.998509 -80.737336

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 **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:  
2/1/2014 2/1/2015 6,000,000 720,000 - -

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:  
2/1/2014 2/1/2015 6,000,000 720,000 - -

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>

02/21/2014

Source Detail

051 01729

WMP-01695

API/ID Number: 047-051-01729

Operator: Chesapeake Energy

Charles Yoho MSH 6H

Source ID: 31578 Source Name Ohio River @ J&R Excavating  
J&R Excavating

Source Latitude: 39.998509  
Source Longitude: -80.737336

HUC-8 Code: 5030106

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

Anticipated withdrawal start date: 2/1/2014

Anticipated withdrawal end date: 2/1/2015

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 6,000,000

Trout Stream?

Tier 3?

Regulated Stream? Ohio River Min. Flow

Max. Pump rate (gpm):

Proximate PSD?

Max. Simultaneous Trucks: 0

Gauged Stream?

Max. Truck pump rate (gpm):

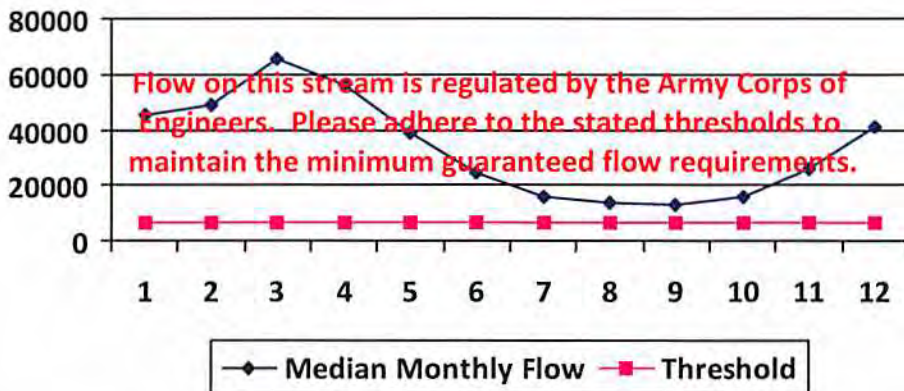
Reference Gaug 9999999 Ohio River Station: Willow Island Lock & Dam

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):	0.00
Downstream Demand (cfs):	0.00
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.

02/21/2014

Source Detail

WMP-01695

API/ID Number: 047-051-01729

Operator:

Chesapeake Energy

Charles Yoho MSH 6H

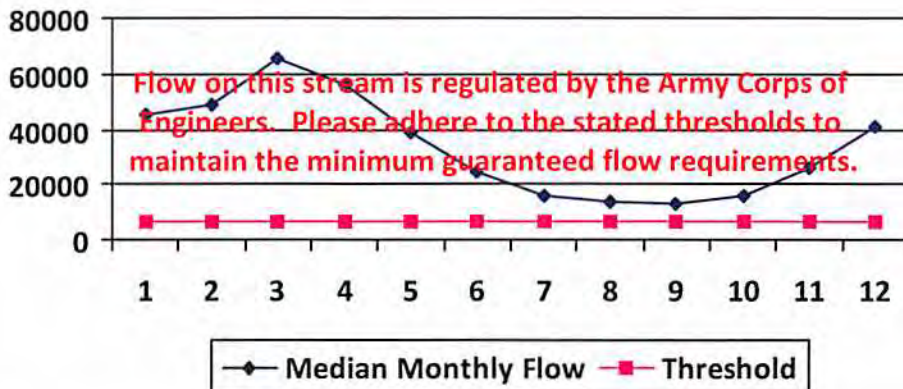
Source ID: 31579 Source Name: The Village of Valley Grove Source Latitude: -  
 The Village of Valley Grove Source Longitude: -  
 HUC-8 Code: 5030106  
 Drainage Area (sq. mi.): 25000 County: Ohio  
 Anticipated withdrawal start date: 2/1/2014  
 Anticipated withdrawal end date: 2/1/2015  
 Total Volume from Source (gal): 6,000,000  
 Max. Pump rate (gpm):  
 Max. Simultaneous Trucks:  
 Max. Truck pump rate (gpm):

Endangered Species?  Mussel Stream?  
 Trout Stream?  Tier 3?  
 Regulated Stream? Ohio River Min. Flow  
 Proximate PSD? Wheeling Water Department  
 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.

Source Detail

051 01729  
Chesapeake Energy

WMP-01695

API/ID Number: 047-051-01729

Operator:

Charles Yoho MSH 6H

Source ID: 31580 Source Name: Ohio County PSD Source Latitude: -  
Ohio county PSD Source Longitude: -  
HUC-8 Code: 5030106  
Drainage Area (sq. mi.): 25000 County: Ohio  
Anticipated withdrawal start date: 2/1/2014  
Anticipated withdrawal end date: 2/1/2015  
Total Volume from Source (gal): 6,000,000  
Max. Pump rate (gpm):  
Max. Simultaneous Trucks:  
Max. Truck pump rate (gpm):

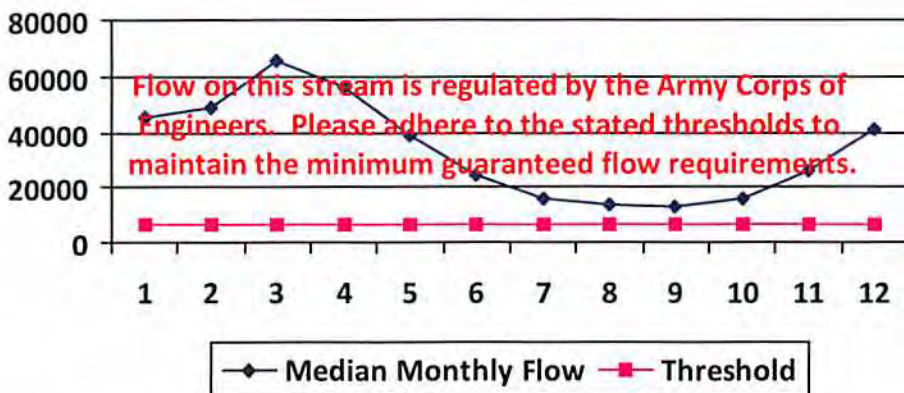
Endangered Species?  Mussel Stream?  
 Trout Stream?  Tier 3?  
 Regulated Stream? Ohio River Min. Flow  
 Proximate PSD? Wheeling Water Department  
 Gauged Stream?

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.

02/21/2014



**Source Detail**

051 01729  
Chesapeake Energy

WMP-01695

API/ID Number: 047-051-01729

Operator:

Charles Yoho MSH 6H

Source ID: 31576 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: 2/1/2014

Anticipated withdrawal end date: 2/1/2015

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 6,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 6,000

Regulated Stream? Ohio River Min. Flow

Max. Simultaneous Trucks: 0

Proximate PSD? Beech Bottom Water Dept.

Max. Truck pump rate (gpm): 0

Gauged Stream?

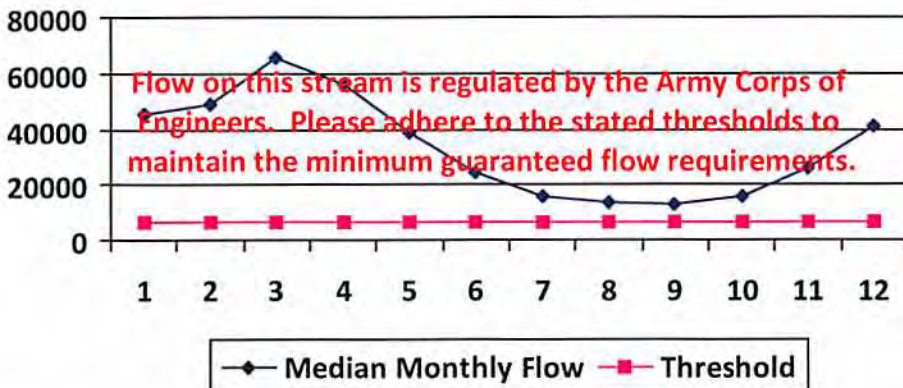
Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

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): 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.

02/21/2014

**Source Detail**

WMP-01695      API/ID Number: 047-051-01729      Operator: Chesapeake Energy

Charles Yoho MSH 6H

Source ID: 31577      Source Name: Little Wheeling Creek WP 1 (Rt. 40 Staging Area)      Source Latitude: 40.078324  
 JDS Investments, LLC      Source Longitude: -80.591145

HUC-8 Code: 5030106

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

Anticipated withdrawal start date: 2/1/2014

Anticipated withdrawal end date: 2/1/2015

Endangered Species?       Mussel Stream?

Total Volume from Source (gal): 6,000,000

Trout Stream?       Tier 3?

Max. Pump rate (gpm): 2,000

Regulated Stream?

Max. Simultaneous Trucks:

Proximate PSD?

Max. Truck pump rate (gpm)

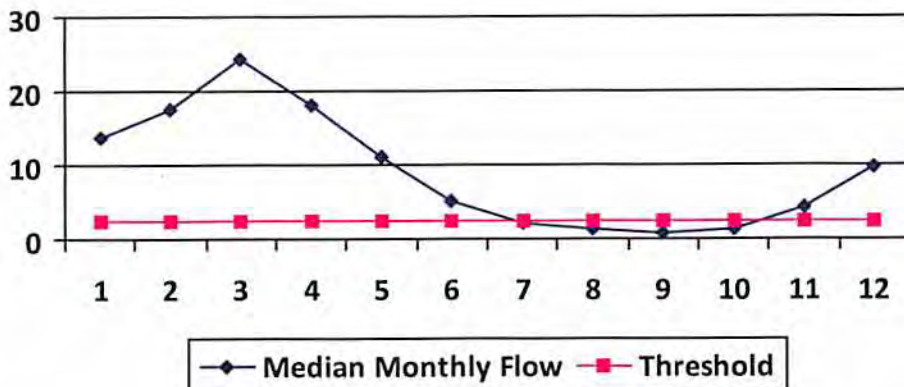
Gauged Stream?

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- 01695      API/ID Number    047-051-01729      Operator:      Chesapeake Energy  
Charles Yoho MSH 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.

### Purchased Water

Source ID:	31581	Source Name	Pennsylvania American Water Public Water Provider	Source start date:	2/1/2014
				Source end date:	2/1/2015
	Source Lat:		Source Long:		County
	Max. Daily Purchase (gal)		720,000	Total Volume from Source (gal):	6,000,000
DEP Comments:	Please ensure that the sourcing of this water confirms to all rules and guidance provided by PA DEP.				

**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:

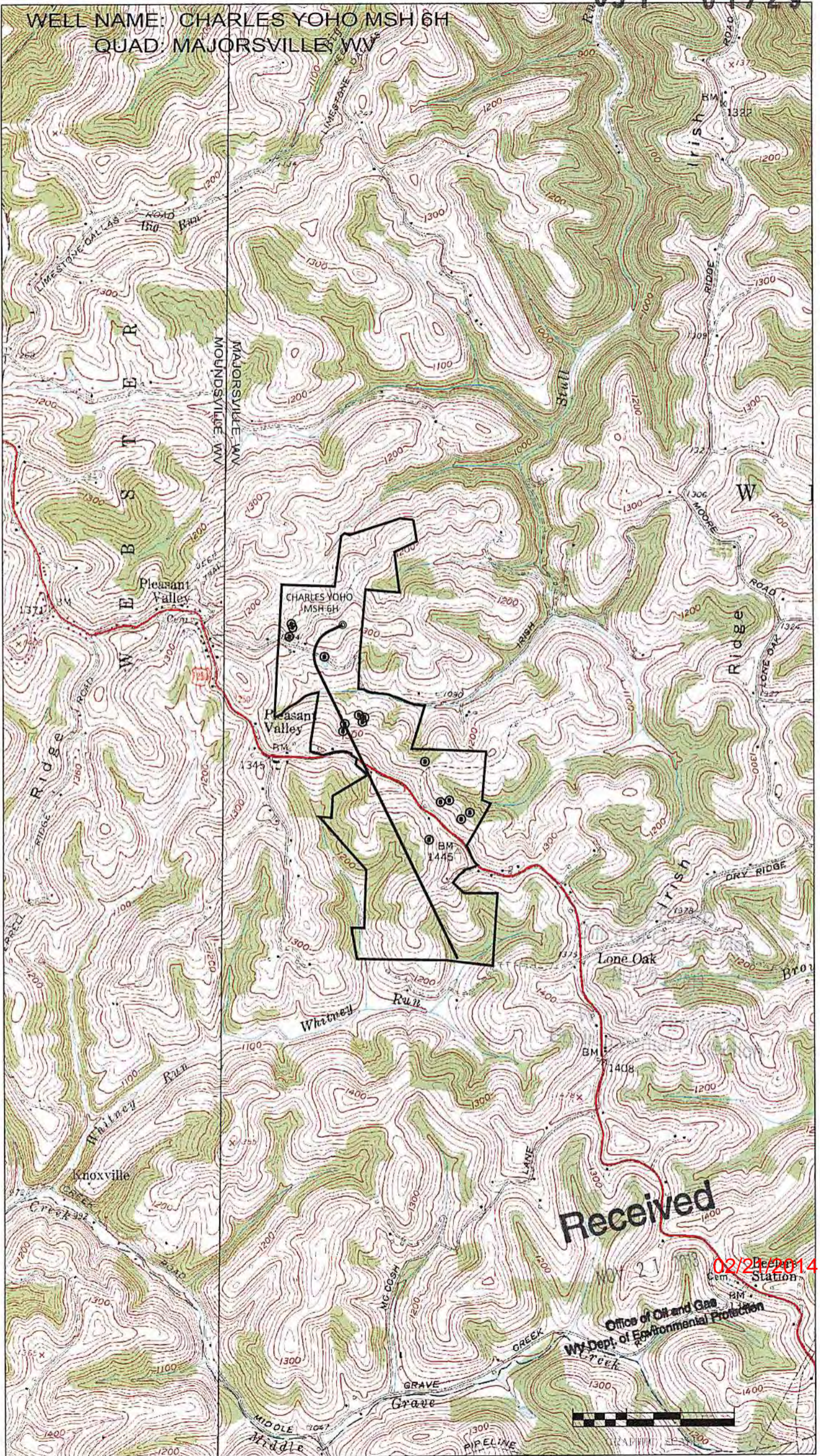
- For groundwater supply wells, DEP recommends that the operator contact the local health department prior to drilling any new well; and reminds the operator that all drinking water wells within 1,500 feet of a water supply well shall be flow- and quality-tested by the operator at the request of the 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:	31582	Source Name	Elite Gasfield Services, Midland Borough		Source start date:	2/1/2014
			Commercial Supplier		Source end date:	2/1/2015
Source Lat:	40.644598	Source Long:	-80.469382	County		
Max. Daily Purchase (gal)	8,640,000	Total Volume from Source (gal):	6,000,000			
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:	31584	Source Name	Various		Source start date:	2/1/2014
					Source end date:	2/1/2015
Source Lat:		Source Long:		County		
Max. Daily Purchase (gal)		Total Volume from Source (gal):	6,000,000			
DEP Comments:	Sources include, but are not limited to, Mark Edison MSH 8H					

WELL NAME: CHARLES YOHO MSH 6H  
QUAD: MAJORSVILLE WV



Received

NOV 27

02/24/2014

Office of Oil and Gas  
WV Dept. of Environmental Protection



SURFACE HOLE DEC. LONG: 80.617213  
 SURVEYED LONG: 80° 37' 02.0"

9,520'

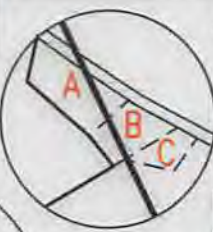
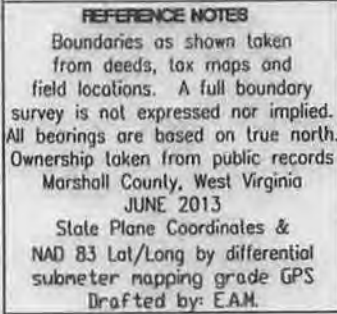
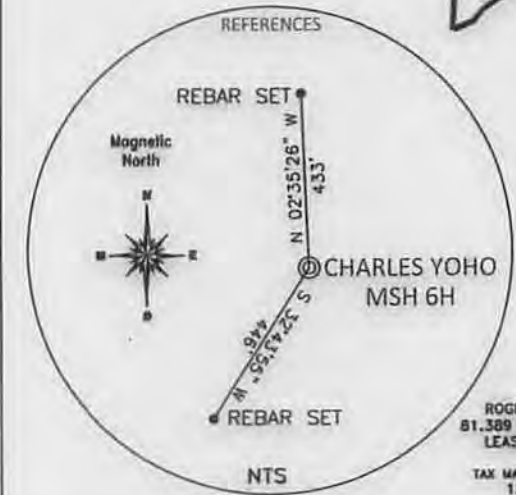
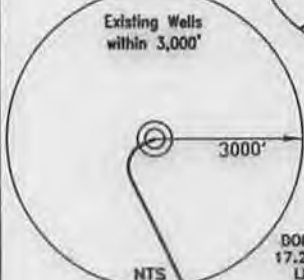
Latitude: 39° 57' 30" (NAD27)

Longitude: 80° 35' 00" (NAD27)

TOP HOLE (UTM NAD 83) N) 4418626.7 E) 532731.2	A) JOHN W. AND GLADYS C. LOVELL 15-8-45.2 LEASE NUMBER 6 0.52 AC
	B) JAMES J. AND MARY E. ANDENORA 15-8-45.1 LEASE NUMBER 7 0.33 AC
	C) JAMES J. AND MARY E. ANDENORA 15-14-6.1 LEASE NUMBER 8 0.18 AC

BOTTOM HOLE (UTM NAD 83)  
N) 4416768.6  
E) 533408.0

NO WATER WELLS WERE FOUND WITHIN 250' OF THE CENTER OF WELL PAD



①	N 88°47'23" W 951'
②	S 87°25'26" W 930'
③	S 30°21'54" W 672'

FILE #: CHE 119  
 DRAWING #: 2275  
 SCALE: PLAT - 1" = 1200'  
 TICK MARK - 1" = 2000'  
 MINIMUM DEGREE OF ACCURACY: 1/200  
 PROVEN SOURCE OF ELEVATION: SUBMETER MAPPING GRADE GPS

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: \_\_\_\_\_  
 L.L.S. #2124 : Ernest J. Benchek III



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WVDEP

OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304

Well Type:  Oil  Waste Diposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: WHEELING CREEK ELEVATION: 1330'  
 COUNTY/DISTRICT: MARSHALL/WEBSTER QUADRANGLE: MAJORSVILLE, WV  
 SURFACE OWNER: DOROTHY L. YOHO ACREAGE: 84.25 +/-  
 OIL & GAS ROYALTY OWNER: DOROTHY L. YOHO ACREAGE: 357.91 +/- 02/21/2014  
 LEASE NUMBERS: \_\_\_\_\_

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
 PLUG OFF FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON   
 CLEAN OUT & REPLUG  OTHER CHANGE  (SPECIFY): \_\_\_\_\_

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,661' TMD: 12,960'  
 WELL OPERATOR: CHESAPEAKE APPALACHIA, LLC DESIGNATED AGENT: ERIC GILLESPIE  
 ADDRESS: PO BOX 18496 ADDRESS: PO BOX 6070  
 CITY: OKLAHOMA CITY STATE: OK ZIP CODE: 73154-0496 CITY: CHARLESTON STATE: WV ZIP CODE: 25301

SURFACE HOLE DEC. LAT: 39.917026  
 SURVEYED LAT: 39° 55' 01.3"