



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

September 26, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-6900176, 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: ROY FERRELL OHI 6H

Farm Name: FERRELL, ROY E.

API Well Number: 47-6900176

Permit Type: Horizontal 6A Well

Date Issued: 09/26/2013

Promoting a healthy environment.

09/27/2013

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 fill material shall be within plus or minus 2% of the optimum moisture content as determined by the standard proctor density test, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort. Each lift must meet 95 % compaction of the optimum density based on results from the standard proctor density test of the actual soils used in specific engineered fill sites. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

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69-00176

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 49447757 69-Ohio 7-Triadelphia 648-Valley Grove
Operator ID County District Quadrangle

2) Operator's Well Number: Roy Ferrell OHI 6H Well Pad Name: Roy Ferrell OHI Pad

3 Elevation, current ground: 1196' Elevation, proposed post-construction: 1196'

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

5) Existing Pad? Yes or No: Yes

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Target formation- Marcellus, Target top TVD- 6616', Target base TVD- 6676', Anticipated thickness- 60', Associated Pressure -4432

7) Proposed Total Vertical Depth: 6,660'

8) Formation at Total Vertical Depth: Marcellus

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9) Proposed Total Measured Depth: 16,500'

AUG 20 2013

10) Approximate Fresh Water Strata Depths: 340'

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

WV Department of
Environmental Protection

12) Approximate Saltwater Depths: 797'

13) Approximate Coal Seam Depths: 691'

14) Approximate Depth to Possible Void (coal mine, karst, other): 691' void abandoned mine.

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): 11.0

19) Area to be disturbed for well pad only, less access road (acres): 7.0

WRH
8-8-13

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(3/13)

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#	741'	741'	680 sx/CTS
Coal	9 5/8"	New	J-55	40#	2,210'	2,210'	820 sx/CTS
Intermediate	7"	New	P-110	20#	If Needed	If Needed	If needed/As Possible
Production	5 1/2"	New	P-110	20#	16,500'	16,500'	Lead 1,140 sx Tail 1,710sx/100' inside intermediate
Tubing	2 3/8"	New	N-80	4.7#	Approx. 7,786'	Approx. 7,786'	
Liners							

WRH
8-8-13

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"	.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

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Kind:	10K Arrowset AS1-X		
Sizes:	5 1/2"		AUG 20 2013
Depths Set:	Approx. 6,197'		WV Department of Environmental Protection

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WW - 6B
(3/13)

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.

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

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

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.

*Note: Attach additional sheets as needed.

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Environmental Protection

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WW-9
(5/13)

Page _____ of _____
API Number 47 -69 - _____
Operator's Well No. Roy Ferrell OHI 6H

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 648-Valley Grove

Elevation 1196' County 69-Ohio District 7-Triadelphia

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

Will a pit be used for drill cuttings? Yes No

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 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/WW0109517/CID28726, Carbon Limestone 28726/CID 28726

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 16th day of August, 20 13

Brittany R Woody
11/27/2013

WV Department of
Environmental Protection
Notary Public

My commission expires _____

09/27/2013

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Form WW-9

Operator's Well No. _____

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 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: *Bob Handwick*

Comments: _____

Title: Oil and Gas Inspector Date: 8-8-13

Field Reviewed? () Yes () No

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Environmental Protection 09/27/2013

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Well Name: Roy Ferrell OHI 6H

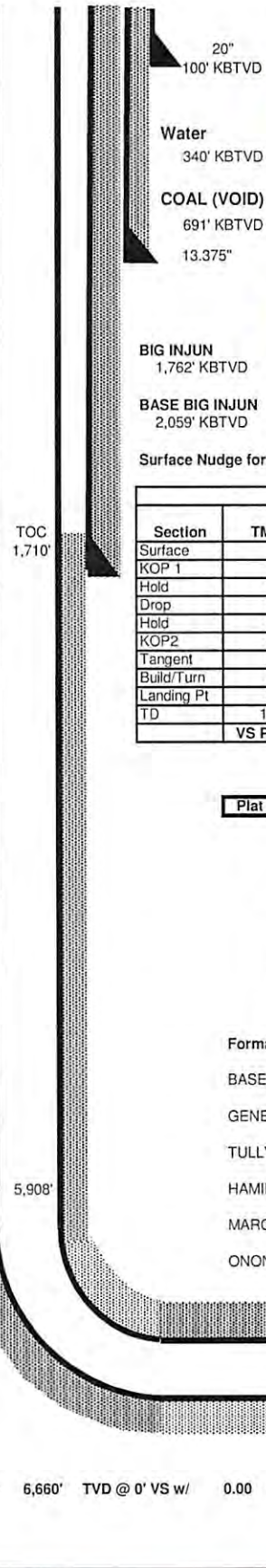
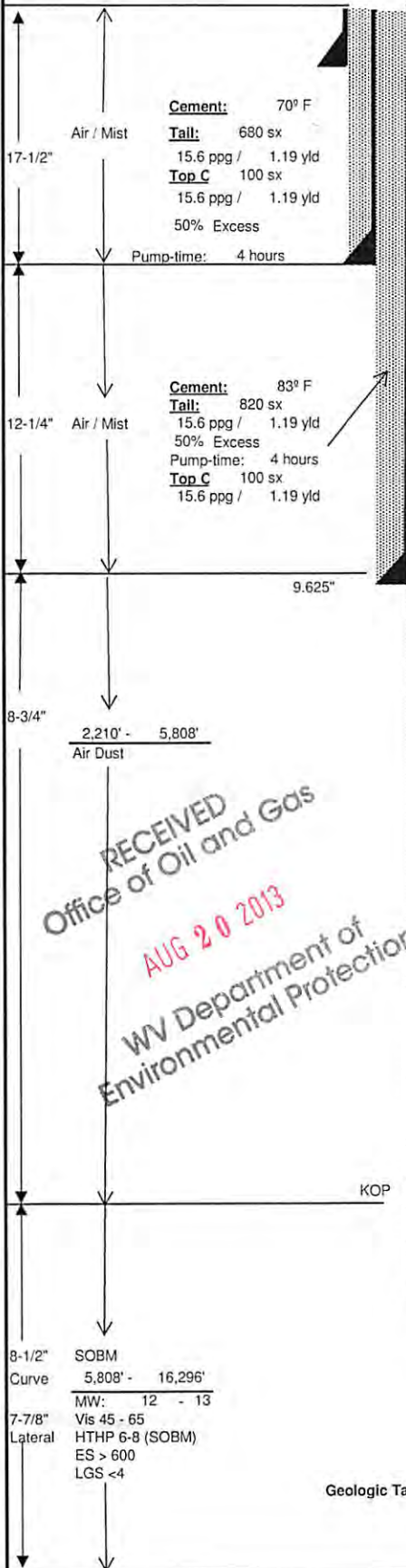
Drilling Rig: N/A

Directional Drilling: N/A

Drilling Engineer: TBD
 Superintendent: N/A
 Asset Manager: N/A
 Geologist: N/A
 Land: N/A

Formation: Marcellus
 County, State: Ohio, WV
 Surface Latitude: 40.043136 Surface Longitude: -80.531233
 BH Latitude: 40.019587 BH Longitude: -80.523398
 KB Elevation: 1230' Ground Elevation: 1210'

Drilling Mud: N/A
 Cement Surface: N/A
 Cement Longstrings: N/A
 Wellhead: N/A
 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'	741'
Interm	9.625	40 #	J-55	LTC	0'	2,210'
Prod	5.5	20 #	P-110	GBCD	0'	16,296'

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

Casing Design						
	Size	ID	Coil	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'
KOP 1	800'	0.00	0.00	800'	0.00	0.00	0.0'	0.0'
Hold	1,200'	8.00	300.00	1,199'	2.00	2.00	13.9'	-24.1'
Drop	1,800'	8.00	300.00	1,793'	0.00	0.00	55.7'	-96.5'
Hold	2,200'	0.00	0.00	2,192'	-2.00	2.00	69.6'	-120.6'
KOP2	5,908'	0.00	0.00	5,900'	0.00	0.00	69.6'	-120.6'
Tangent	6,515'	72.80	224.38	6,356'	12.00	12.00	-170.7'	-355.8'
Build/Turn	7,224'	72.80	224.38	6,566'	0.00	0.00	-654.4'	-829.1'
Landing Pt	7,786'	90.00	157.97	6,660'	3.06	12.00	-1,168.2'	-922.7'
TD	16,296'	90.00	157.97	6,660'	0.00	0.00	-9,056.6'	2,269.3'
VS Plane	157.97						VS Length	9,246.51'

Lateral Length ==> 8,509.70'

Plat Date 7/23/13

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

Mudlogger operational at Surface

Formation Depths (TVD)

BASE BIG INJUN	2,059'
GENESECO	6,454'
TULLY	6,484'
HAMILTON	6,512'
MARCELLUS	6,630'
ONONDAGA	6,690'

Cement: 122° F
 Lead: 1,140 sx
 15.6 ppg / 1.20 yld
 Tail: 1,710 sx
 15.6 ppg / 1.20 yld
 15% Excess
 Pump-time: 6 hours

PBHL 5.5'
 TMD: 16,296'
 TVD: 6,660'
 Inclination: 90.00 deg

Geologic Target: 6,660' TVD @ 0' VS w/ 0.00 degrees/100 ft Up-dip

09/27/2013

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

Drawn by: TBD
 Date: 7/26/2013

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Water Management Plan: Primary Water Sources



WMP- 01399

API/ID Number: 047-069-00176

Operator:

Chesapeake Energy

Roy Ferrell OHI 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 SEP 20 2013

09/27/2013

Source Summary

WMP- 01399

API Number: 047-069-00176

Operator:

Chesapeake Energy

Roy Ferrell OHI 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:
9/1/2013	9/1/2014	6,652,800		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:
9/1/2013	9/1/2014	6,652,800		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:

● Source **Middle Wheeling Creek @ Anderson Withdrawal Site** Brooke Owner: **Paul & Verna Anderson**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
9/1/2013	9/1/2014	6,652,800		40.04409	-80.55348

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

Max. Pump rate (gpm): **2,500** Min. Gauge Reading (cfs): **62.57** Min. Passby (cfs) **4.17**

DEP Comments:

09/27/2013

Source Summary

WMP-01399

API Number: 047-069-00176

Operator: Chesapeake Energy

Roy Ferrell OHI 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:
9/1/2013	9/1/2014	6,652,800	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:
9/1/2013	9/1/2014	6,652,800	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:
9/1/2013	9/1/2014	6,652,800	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>

09/27/2013

Source Detail

WMP- 01399

API/ID Number: 047-069-00176

Operator: Chesapeake Energy

Roy Ferrell OHI 6H

Source ID: 23111 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: 9/1/2013

Anticipated withdrawal end date: 9/1/2014

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 6,652,800

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)

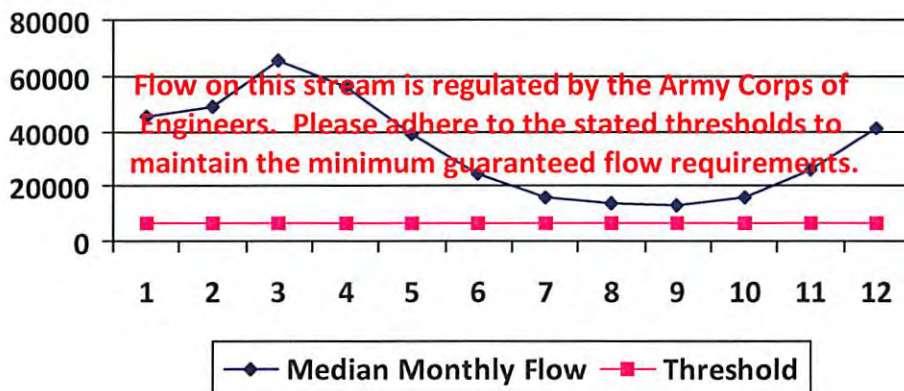
Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

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.

09/27/2013

Source Detail

WMP-01399

API/ID Number: 047-069-00176

Operator:

Chesapeake Energy

Roy Ferrell OHI 6H

Source ID: 23113 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: 9/1/2013

Anticipated withdrawal end date: 9/1/2014

Endangered Species? Mussel Stream?

Total Volume from Source (gal): 6,652,800

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?

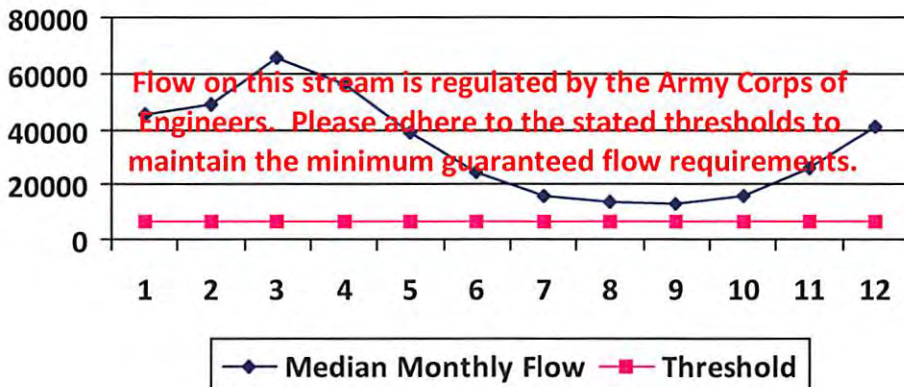
Reference Gaug: 9999999 Ohio River Station: Willow Island Lock & Dam

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.

09/27/2013

Source Detail

WMP-01399

API/ID Number: 047-069-00176

Operator: Chesapeake Energy

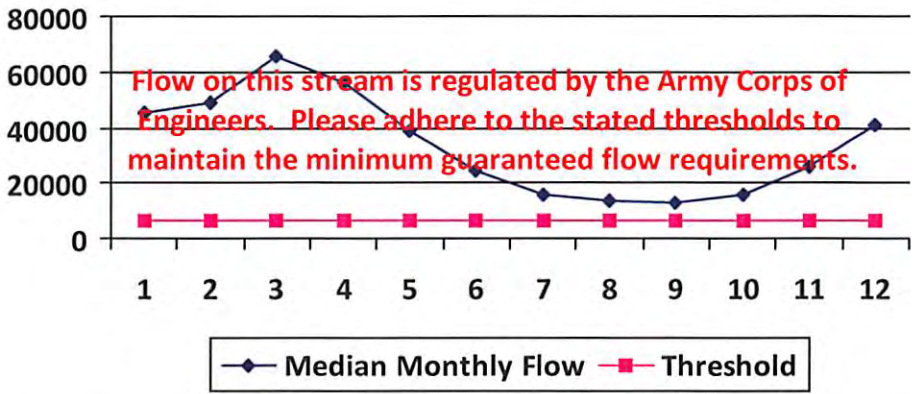
Roy Ferrell OHI 6H

Source ID: 23114	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: 9/1/2013
<input type="checkbox"/> Endangered Species?	<input checked="" type="checkbox"/> Mussel Stream?		Anticipated withdrawal end date: 9/1/2014
<input type="checkbox"/> Trout Stream?	<input type="checkbox"/> Tier 3?		Total Volume from Source (gal): 6,652,800
<input checked="" type="checkbox"/> Regulated Stream?	Ohio River Min. Flow		Max. Pump rate (gpm):
<input checked="" type="checkbox"/> Proximate PSD?	Wheeling Water Department		Max. Simultaneous Trucks:
<input checked="" type="checkbox"/> 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):	-
Downstream Demand (cfs):	-
Pump rate (cfs):	-
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
<hr/>	
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.

09/27/2013

Source Detail

WMP-01399

API/ID Number: 047-069-00176

Operator: Chesapeake Energy

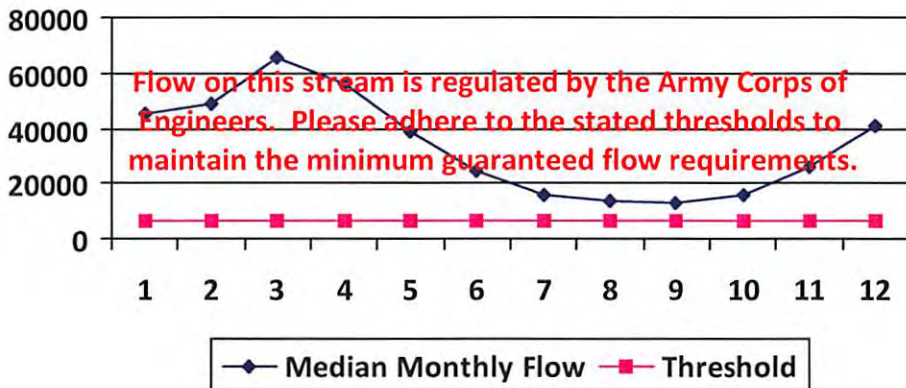
Roy Ferrell OHI 6H

Source ID: 23108	Source Name: Ohio River WP 1 (Beech Bottom Staging Area) Brownlee Land Ventures	Source Latitude: 40.226889
HUC-8 Code: 5030106	Drainage Area (sq. mi.): 25000	Source Longitude: -80.658972
County: Brooke	Anticipated withdrawal start date: 9/1/2013	Anticipated withdrawal end date: 9/1/2014
<input type="checkbox"/> Endangered Species?	<input checked="" type="checkbox"/> Mussel Stream?	Total Volume from Source (gal): 6,652,800
<input type="checkbox"/> Trout Stream?	<input type="checkbox"/> Tier 3?	Max. Pump rate (gpm): 6,000
<input checked="" type="checkbox"/> Regulated Stream?	Ohio River Min. Flow	Max. Simultaneous Trucks: 0
<input checked="" type="checkbox"/> Proximate PSD?	Beech Bottom Water Dept.	Max. Truck pump rate (gpm): 0
<input checked="" type="checkbox"/> 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.

09/27/2013

Source Detail

WMP-01399

API/ID Number: 047-069-00176

Operator:

Chesapeake Energy

Roy Ferrell OHI 6H

Source ID: 23109 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

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Anticipated withdrawal start date: 9/1/2013
 Anticipated withdrawal end date: 9/1/2014
 Total Volume from Source (gal): 6,652,800
 Max. Pump rate (gpm): 2,000
 Max. Simultaneous Trucks:
 Max. Truck pump rate (gpm)

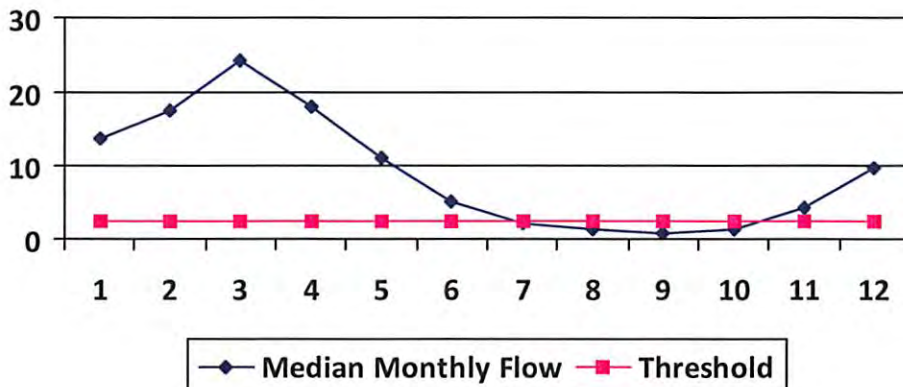
Reference Gaug: 3112000 WHEELING CREEK AT ELM GROVE, WV

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.

09/27/2013

Source Detail

WMP- 01399

API/ID Number: 047-069-00176

Operator:

Chesapeake Energy

Roy Ferrell OHI 6H

Source ID: 23110 Source Name: Middle Wheeling Creek @ Anderson Withdrawal Sit
Paul & Verna Anderson

Source Latitude: 40.04409
Source Longitude: -80.55348

HUC-8 Code: 5030106

Drainage Area (sq. mi.): 20.54 County: Brooke

- Endangered Species? Mussel Stream?
- Trout Stream? Tier 3?
- Regulated Stream?
- Proximate PSD?
- Gauged Stream?

Anticipated withdrawal start date: 9/1/2013

Anticipated withdrawal end date: 9/1/2014

Total Volume from Source (gal): 6,652,800

Max. Pump rate (gpm): 2,500

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm): 0

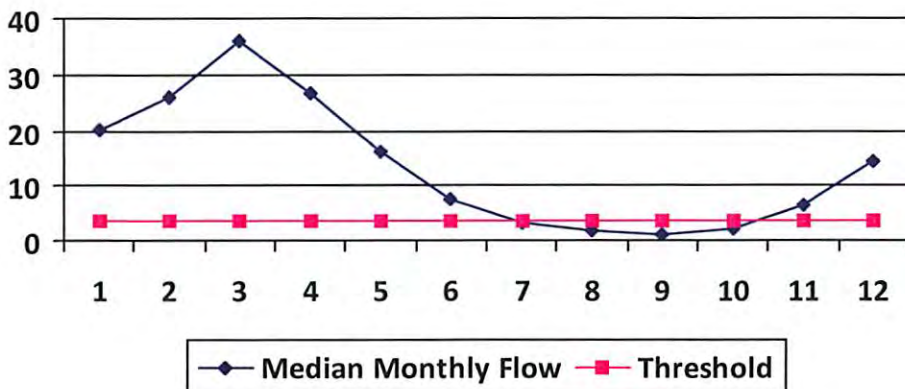
Reference Gaug: 3112000 WHEELING CREEK AT ELM GROVE, WV

Drainage Area (sq. mi.): 281.00

Gauge Threshold (cfs): 38

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	20.35	9.74	10.73
2	25.97	9.74	16.35
3	36.01	9.74	26.39
4	26.73	9.74	17.11
5	16.30	9.74	6.68
6	7.42	9.74	-2.20
7	3.28	9.74	-6.34
8	1.92	9.74	-7.70
9	1.22	9.74	-8.40
10	2.02	9.74	-7.60
11	6.35	9.74	-3.27
12	14.40	9.74	4.78

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	2.78
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	5.57
Headwater Safety (cfs):	0.69
Ungauged Stream Safety (cfs):	0.69
Min. Gauge Reading (cfs):	62.57
Passby at Location (cfs):	4.17

"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.

09/27/2013



Water Management Plan: Secondary Water Sources



WMP- 01399

API/ID Number 047-069-00176

Operator:

Chesapeake Energy

Roy Ferrell OHI 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:	23112	Source Name:	Pennsylvania American Water	Source start date:	9/1/2013
			Public Water Provider	Source end date:	9/1/2014
	Source Lat:		Source Long:		County
	Max. Daily Purchase (gal)		720,000	Total Volume from Source (gal):	6,652,800
DEP Comments:	Please ensure that the sourcing of this water confirms to all rules and guidance provided by PA DEP.				

Roy Ferrell OHI 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.

Recycled Frac Water

Source ID: 23115 Source Name Chad Glauser OHI 10H

Source start date: 9/1/2013

Source end date: 9/1/2014

Source Lat:

Source Long:

County

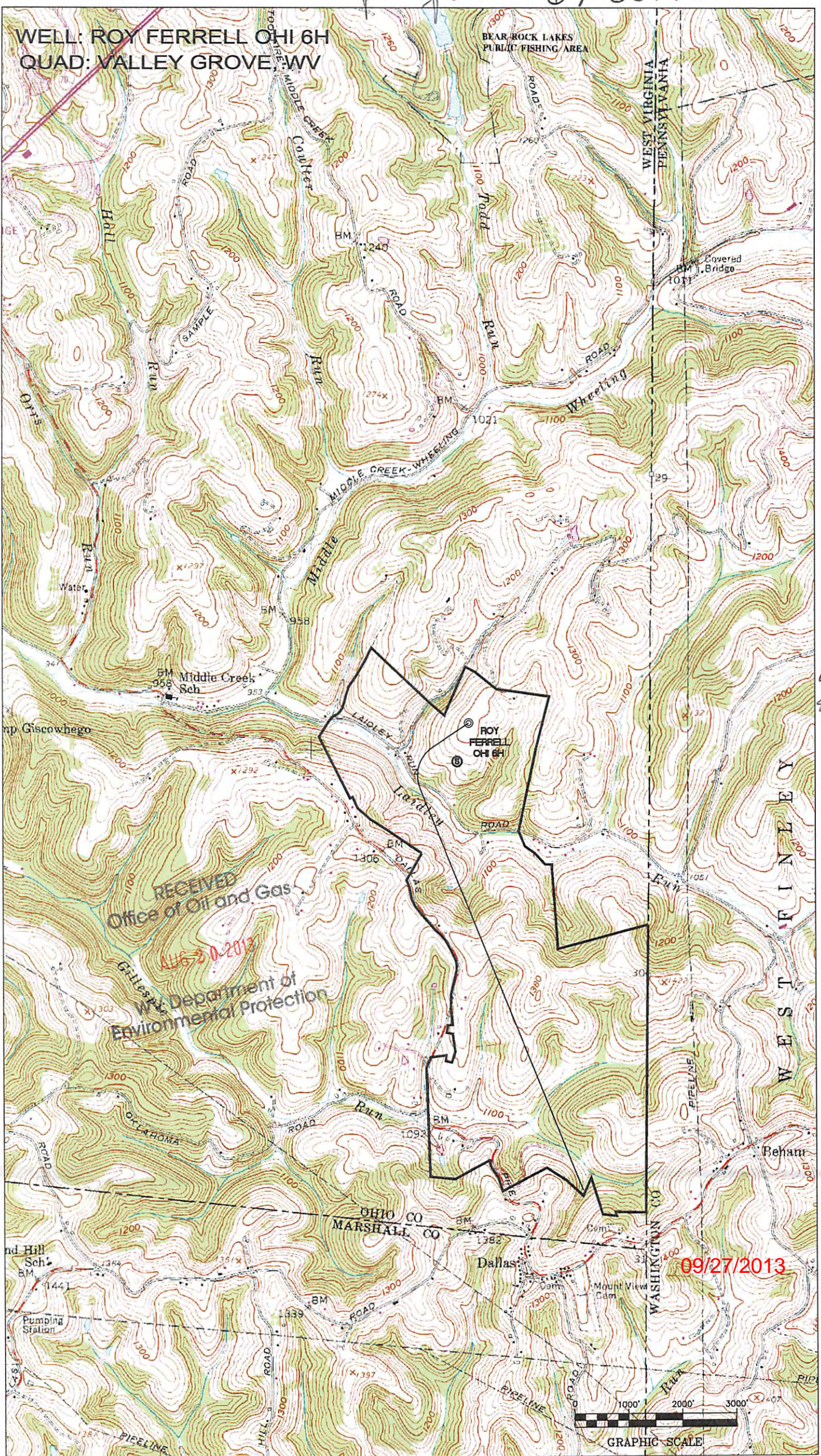
Max. Daily Purchase (gal)

Total Volume from Source (gal): 1,663,200

DEP Comments:

plot spotted 69-00176

WELL: ROY FERRELL OHI 6H
QUAD: VALLEY GROVE, WV



RECEIVED
Office of Oil and Gas
AUG 30 2013
West Virginia Department of
Environmental Protection

09/27/2013

WRK
8-9-B

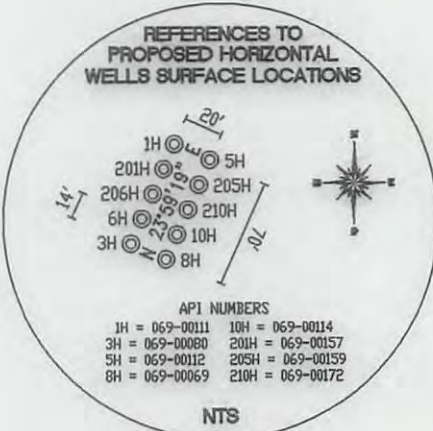
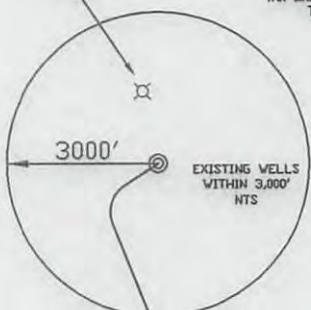
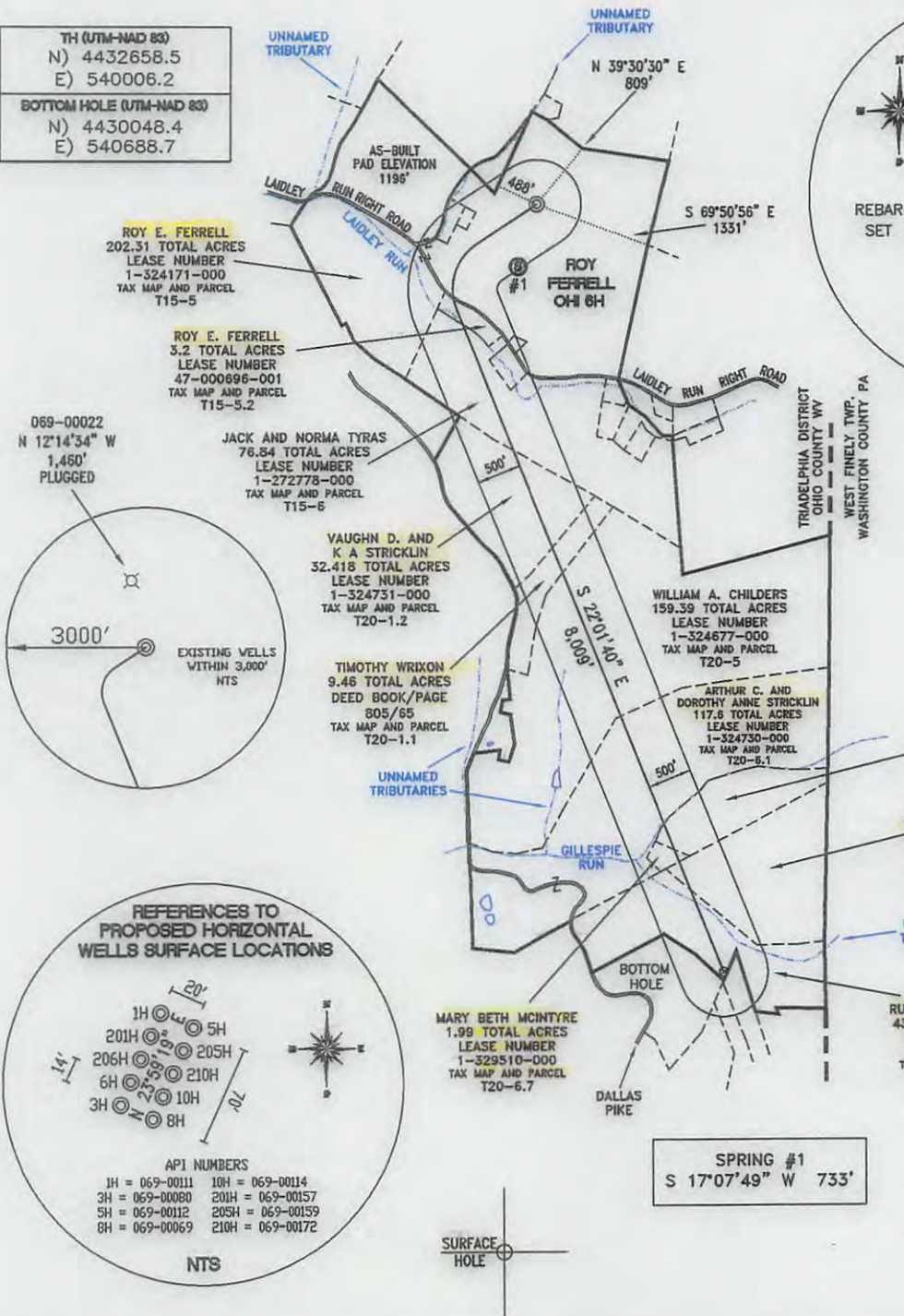
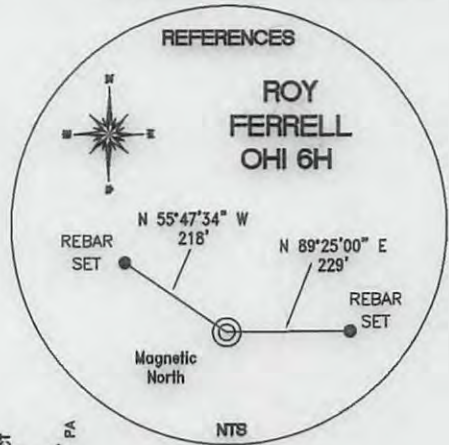
WEST VIRGINIA
PENNSYLVANIA

OHIO CO
MARSHALL CO

WASHINGTON CO

GRAPHIC SCALE

TH (UTM-NAD 83)
N) 4432658.5
E) 540006.2
BOTTOM HOLE (UTM-NAD 83)
N) 4430048.4
E) 540688.7

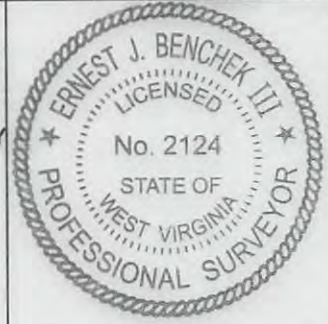


REFERENCE NOTES
 Boundaries as shown taken from deeds, tax maps and field locations. A full boundary survey is not expressed nor implied. All bearings are based on true north. Ownership taken from public records Ohio County, West Virginia FEBRUARY 2011 State Plane Coordinates & NAD 83 Lat/Long by differential submeter mapping grade GPS Drafted by: E.A.M.

*WPK
8-8-13*

FILE #: CHE 034
 DRAWING #: 1855
 PLAT = 1" - 2000'
 SCALE: TICK MARK = 1" - 2000'
 MINIMUM DEGREE OF ACCURACY: 1/200
 PROVEN SOURCE SUBMETER MAPPING OF ELEVATION: 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: 1196'
 COUNTY/DISTRICT: OHIO/TRIADELPHIA QUADRANGLE: VALLEY GROVE WW.
 SURFACE OWNER: ROY E. FERRELL ACREAGE: 202.31 +/-
 OIL & GAS ROYALTY OWNER: ROY E. FERRELL ACREAGE: 581.28 +/-

DATE: JULY 30, 2013
 OPERATOR'S WELL #: ROY FERRELL OHI 6H
 API WELL #: 47 69 00176 H6A
 STATE COUNTY PERMIT

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: 6,660' TMD: 15,796'
 WELL OPERATOR : CHESAPEAKE APPALACHIA, LLC. DESIGNATED AGENT : ERIC B. 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

09/27/2013