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**west virginia** department of environmental protection

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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](http://www.dep.wv.gov)

January 21, 2014

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-1706391, issued to EQT PRODUCTION COMPANY, 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: 512482  
Farm Name: HARPER, LUCY E.  
**API Well Number: 47-1706391**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 01/21/2014

**Promoting a healthy environment.**

## 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**  
**W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION**

1) Well Operator: EQT Production Company

	017	8	526
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Operator ID      County      District      Quadrangle

2) Operator's Well Number: 512482      Well Pad Name OXF149

3 Elevation, current ground: 1240'      Elevation, proposed post-construction: 1,242.5

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

5) Existing Pad? Yes or No: yes

*DCW*  
*10-4-2013*

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Target formation is Marcellus at a depth of 6670' with the anticipated thickness to be 60 feet and anticipated target pressure of 4489 PSI

7) Proposed Total Vertical Depth: 6,670

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 10,793

10) Approximate Fresh Water Strata Depths: 274, 313, 380, 425

11) Method to Determine Fresh Water Depth: By offset wells

12) Approximate Saltwater Depths: none

13) Approximate Coal Seam Depths: 629

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

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of Mine: None Reported

16) Describe proposed well work:  
Drill and complete a new horizontal well in the Marcellus formation.  
The vertical drill to go down to an approximate depth of 5690'.  
Then kick off the horizontal leg into the Marcellus using a slick water frac.

17) Describe fracturing/stimulating methods in detail:  
Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from freshwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid, gelling agent, gel breaker, friction reducer, biocide, and scale inhibitor). Stage lengths vary from 150 to 450 feet. Average approximately 100,000 gallons of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 400,000 pounds of sand per stage.

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 15.4

19) Area to be disturbed for well pad only, less access road (acres): 15.4

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WW - 6B  
(3/13)

**CASING AND TUBING PROGRAM**

18)

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: for Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu.Ft.)
Conductor	20	New	MC-50	81	40	40	38 CTS
Fresh Water	13 3/8	New	MC-50	54	905	905	789 CTS
Coal							
Intermediate	9 5/8	New	MC-50	40	3,103	3,103	1,215 CTS
Production	5 1/2	New	P-110	20	10,793	10,793	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run well be cut 100' less than ID
Liners							

*DCN  
1-14-2014*

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20	24	0.375	-	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	1	1.21
Coal						
Intermediate	9 5/8	12 3/8	0.395	3,590	1	1.21
Production	5 1/2	8 1/2	0.361	12,640	-	1.27/1.86
Tubing						
Liners						

**Packers**

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

Note 1: EQT plans to bring the TOC on the production casing cement job 1,000' above kick off point, which is at least 500' above the shallowest production zone, to avoid communication.



January 10, 2014

Mr. Gene Smith  
West Virginia Department of Environmental Protection  
Office of Oil and Gas  
601 57th Street SE  
Charleston, WV 25304

Re: Casing change on OXF149 (512482) 017-06391

Dear Mr. Smith,

Attached is a modification to the casing program for the above well. EQT is requesting the 13 3/8" surface casing to be set 50' below the deepest red rock show to cover potential red rock issues. The proposed casing set depth is above ground elevation. The reason for this is the red rock swells during drilling of the intermediate section causing many drilling problems such as but not limited to lost drilling assemblies and casing running issues.

After reviewing the OXF149, we would like to request to set the surface casing deeper on each well. The 13 3/8" casing will be set at a depth of approximately 905' KB (50' below the anticipated red rock show).

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Vicki Roark', is written over a light blue horizontal line.

Vicki Roark  
Permitting Supervisor-WV

Enc.

cc: Douglas Newlon  
4060 Dutchman Road  
Macfarlan, WV 26148

21) Describe centralizer placement for each casing string.

• Surface: Bow spring centralizers – One at the shoe and one spaced every 500'.

• Intermediate: Bow spring centralizers– One cent at the shoe and one spaced every 500'.

• Production: One spaced every 1000' from KOP to Int csg shoe

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

Surface (Type 1 Cement): 0-3% Calcium Chloride

Used to speed the setting of cement slurries.

0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of the cement slurry to a thief zone.

Intermediate (Type 1 Cement): 0-3% Calcium Chloride. Salt is used in shallow, low temperature formations to speed the setting of cement slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of whole drilling fluid or cement slurry (not filtrate) to a thief zone.

Production:

Lead (Type 1 Cement): 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.

0.3% CFR (dispersant). Makes cement easier to mix.

Tail (Type H Cement): 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening time.

0.2-0.3% CFR (dispersant). This is to make the cement easier to mix.

60 % Calcium Carbonate. Acid solubility.

0.4-0.6% Halad (fluid loss). Reduces amount of water lost to formation.

23) Proposed borehole conditioning procedures. Surface: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, continue to circulate an additional 5 minutes. To ensure that there is no fill, short trip two stands with no circulation. If there is fill, bring compressors back on and circulate hole clean. A constant rate of higher than expected cuttings volume likely indicates washouts that will not clean up.

Intermediate: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, continue to circulate an additional 5 minutes. If foam drilling, to enhance hole cleaning use a soap sweep or increase injection rate & foam concentration.

Production: Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes bottoms up volume.

Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean. Check volume of cuttings coming across the shakers every 15 minutes.

\*Note: Attach additional sheets as needed.

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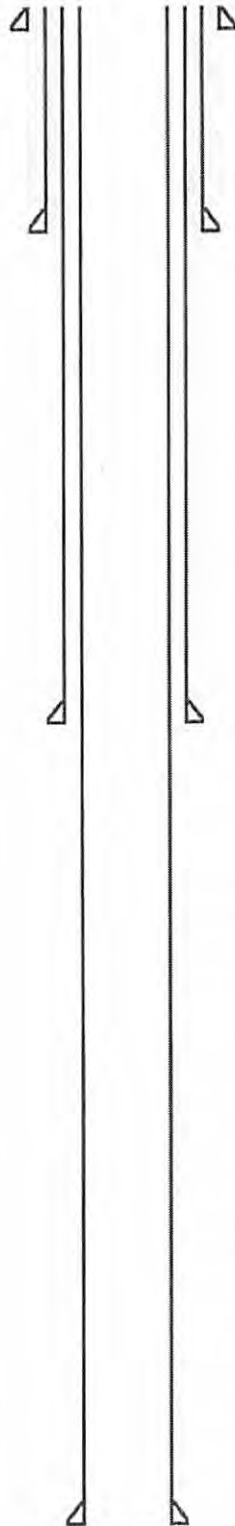
Well Schematic  
EQT Production

Well Name: 512452 (DXP149HS)  
County: Doddridge  
State: West Virginia

Elevation KB:  
Target  
Prospect  
Azimuth  
Vertical Section

1250
Marcellus
335
3280

0' —  
500' — 425' Fresh Water Base  
1,000' — 855' Base Red Rock  
1,500' —  
2,000' — 1,773' Maxton  
1,982' Big Lime  
2,093' Big Injun  
2,272' Weir  
2,480' -Gantz  
2,500' —  
2,574' -Filty foot  
2,675' -Thirty foot  
2,720' -Gordon  
2,819' -Forth Sand  
3,000' — 2,998' -Bayard  
3,103' Int. csg pt  
3,327' -Warren  
3,500' — 3,398' -Speechley  
3,860' -Balltown A  
4,000' —  
4,500' — 4,518' -Riley  
5,000' — 4,936' -Benson  
5,183' -Alexander  
5,500' —  
6,000' — 6,304' -Sonyea  
6,444' -Middlesex  
6,473' -Genesee  
6,575' -Genesee  
6,613' -Tully  
6,500' — 6,617' -Hamilton  
6,640' -Marcellus  
6,700' Onondaga



0' — Hole Size 24" - 20" Conductor at 40'  
Bit Size 17.5"  
500' —  
1,000' — TOC @ Surface  
13 3/8" MC-50, 54.5# @ 905' ft MD  
Bit Size 12.375"  
1,500' —  
2,000' —  
2,500' —  
3,000' — TOC @ Surface  
9 5/8" MC-50, 40# @ 3,103' ft MD  
Bit Size 8.5"  
3,500' —  
4,000' —  
4,500' —  
5,000' —  
5,500' —  
6,000' — KOP = 5,690' ft MD  
10 Deg DLS  
Land @ 7,463' ft MD  
6,670' ft TVD  
6,500' — 5 1/2", P-110, 20#  
10,293' ft MD  
6,670' ft TVD

Well 512482 (OXF149H5)

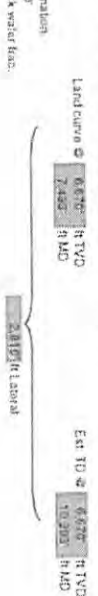
EOT Production  
Oxford Quad  
Doddridge

Acres 315  
Vertical Section 5283

West Virginia

TVD Depth (feet)	Formation Top (TVD)	Formation Bottom (TVD)	Formation Name	Well Depth (feet)	Well Diameter (inches)	Casing Type	Casing Size (inches)	Weight/Grade
250'			Blue River Sand	1200'	12.39	Conductor	12.39	54# JMC 50
400'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
500'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
750'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
1000'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
1200'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
1500'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
1750'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
2000'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
2250'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
2500'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
2750'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
3000'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
3250'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
3500'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
3750'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
4000'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
4250'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
4500'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
4750'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
5000'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
5250'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
5500'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
5750'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
6000'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
6250'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
6500'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50
6750'			Marcellus	1200'	12.39	Intermediate	12.39	40# JMC 50

Proposed Well Work:  
Drill and complete a new horizontal well in the Marcellus formation.  
The vertical well to go down to an approximate depth of 5500'.  
Then kick off the horizontal leg into the Marcellus using a slick water frac.





WW-9 (5/13)

API No. 47 - 017 - 0 Operator's Well No. 512482

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

Fluids/Cuttings Disposal & Reclamation Plan

Operator Name OXF149 OP Code

Watershed (HUC10) Left Fork Arnolds Creek Quadrangle Oxford 7.5'

Elevation 1242.5 County Doddridge District West Union

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:

Will a synthetic liner be used in the pit? Yes No [X] If so, what ml.? 60

Proposed Disposal Method For Treated Pit Wastes:

- Land Application
Underground Injection ( UIC Permit Number 0014, 8462, 4037 )
Reuse (at API Number )
Off Site Disposal (Supply form WW-9 for disposal location)
Other (Explain )

DCN 10-4-2013

Will closed loop system be used? YES

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

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

Additives to be used in drilling medium? MILBAR, Viscosifer, Alkalinity Control, Lime, Chloride Salts, Rate Filtration Control,

Delfocculant, Lubricant, Detergent, Defoaming, Walnut Shell, X-Cide, SOLTEX Terra

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) n/a

Landfill or offsite name/permit number? See Attached List

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.

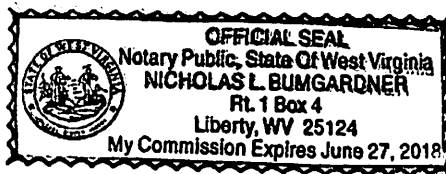
I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete.

Company Official Signature Victoria J. Roark
Company Official (Typed Name) Victoria J. Roark
Company Official Title Permitting Supervisor

Subscribed and sworn before me this 17 day of September, 2013

Notary Public

My commission expires 6/27/2018



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WV Department of Environmental Protection

Proposed Revegetation Treatment: Acres Disturbed 15.4 Prevegetation pH 6.8

Lime 3 Tons/acre or to correct to pH 6.5

Fertilizer (10-20-20 or equivalent) 1/3 lbs/acre (500 lbs minimum)

Mulch 2 Tons/acre

Seed Mixtures

Area I		Area II	
Seed Type	lbs/acre	Seed Type	lbs/acre
KY-31	40	Orchard Grass	15
Alsike Clover	5	Alsike Clover	5
Annual Rye	15		

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

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: Douglas Newlan

Comments: MAINTAIN ETS Preseed + Mulch any new disturbed areas to WV Dep regulations

Title: Oil & Gas Inspector Date: 10-4-2013

Field Reviewed? ( / ) Yes ( ) No

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**EQT Production Water plan**  
**Offsite disposals for Marcellus wells**

017 06391

**CWS TRUCKING INC.**

P.O. Box 391  
Williamstown, WV 26187  
740-516-3586  
Noble County/Noble Township  
Permit # 3390

**LAD LIQUID ASSETS DISPOSAL INC.**

226 Rankin Road  
Washington, PA 15301  
724-350-2760  
724-222-6080  
724-229-7034 fax  
Ohio County/Wheeling  
Permit # USEPA WV 0014

**TRI COUNTY WASTE WATER MANAGEMENT, INC.**

1487 Toms Run Road  
Holbrook, PA 15341  
724-627-7178 Plant  
724-499-5647 Office  
Greene County/Waynesburg  
Permit # TC-1009

**Waste Management - Meadowfill Landfill**

Rt. 2, Box 68 Dawson Drive  
Bridgeport, WV 26330  
304-326-6027  
Permit #SWF-1032-98  
Approval #100785WV

**Waste Management - Northwestern Landfill**

512 E. Dry Road  
Parkersburg, WV 26104  
304-428-0602  
Permit #SWF-1025 WV-0109400  
Approval #100833WV

**BROAD STREET ENERGY LLC**

37 West Broad Street  
Suite 1100  
Columbus, Ohio 43215  
740-516-5381  
Washington County/Belpre Twp.  
Permit # 8462

**TRIAD ENERGY**

P.O. Box 430  
Reno, OH 45773  
740-516-6021 Well  
740-374-2940 Reno Office Jennifer  
Nobel County/Jackson Township  
Permit # 4037

**KING EXCAVATING CO.**

Advanced Waste Services  
101 River Park Drive  
New Castle, Pa. 16101  
Facility Permit# PAR000029132

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Environmental Protection



017 06391

Where energy meets innovation.™

# Site Specific Safety and Environmental Plan For

EQT OXF 149 Pad

Doddridge County, WV

For Wells:

512482   512478   512479   513136   \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date Prepared:

July 31, 2013

[Signature]  
EQT Production  
Permitting Supervisor  
Title  
9-20-13  
Date

[Signature]  
WV Oil and Gas Inspector  
Title  
10-4-2013  
Date

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Local, State, and Federal Agency Numbers	Assigned Specialist Response Numbers <span style="float: right;">017 06391</span>
<p><b>Local State Well Inspector</b>            WVDEP Office of Oil and Gas Derek Haught            P. O. Box 85            Smithville            WV 26178  <i>Pollution and Emergency Spills 1-800-642-3074</i>            304-206-7613 (Cell)</p> <p><b>USCG/ National Response Center (NRC):</b>            800.424.8802</p> <p><b>CHEMTREC</b>            Emergency: 800.424.9300            Business: 800.262.8200</p> <p><b>US DOT Pipeline and Hazardous Materials Safety Administration (PHMSA)</b>            Haz-Mat: 800.467.4922            Pipeline: 202.366.4595</p> <p><i>WV Dep Doug Newton            4060 Dutchman Road            MacFarlan WV 26149</i></p>	<p><b>Primary Spill Response Company:</b>            Ryan Environmental, Inc.  <b>EMERGENCY PHONE: 800.649.5578</b>            BUSINESS: 304.842.5578            Route 4 Box 260, 76E            Bridgeport, WV 26330</p> <p><b>Secondary Spill Response Company:</b>            Miller Environmental Inc.  <b>EMERGENCY PHONE 1-888-988-8655</b>            1-304-292-8655            514 Hartman Run Road            Morgantown, WV 26505</p> <p><b>Primary Well Emergency Response Company:</b>            Wild Well Control  <b>EMERGENCY PHONE: 281-784-4700</b>            BUSINESS PHONE: 281-784-4700            2002 Oil Center Court            Houston, TX 77073            Michael Wilford/ PA Safety Coordinator</p> <p><b>Secondary Well Emergency Response Company:</b>            Boots &amp; Coots  <b>EMERGENCY PHONE: 1-281-931-8884 or 800-256-9688</b>            BUSINESS PHONE: same as above            10200 Bellaire Blvd.            Houston, TX 77072</p> <p><b>Primary Hazardous Waste Disposal Company:</b>            NAME: Ryan Environmental, Inc.  <b>EMERGENCY PHONE: 800.649.5578</b>            BUSINESS PHONE: 304.842.5578            ADDRESS Route 4 Box 260, 76E            ADDRESS Bridgeport, WV 26330</p> <p><b>Primary Hydrogen Sulfide (H<sub>2</sub>S) Company:</b>            Safety Consultants; McCulley, Eastham, and Associates  <b>EMERGENCY PHONE: 1-800-556-4227</b>            CONTACT NAME/TITLE: Matt Boggs at 606-922-2066</p>

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## Water Management Plan: Primary Water Sources



WMP-01606

API/ID Number: 047-017-06391

Operator:

EQT Production Company

512482 (OXF149H5)

### 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 13 2013

Source Summary

017 06391

WMP-01606

API Number:

047-017-06391

Operator:

EQT Production Company

512482 (OXF149H5)

Stream/River

● Source Ohio River @ Westbrook Trucking Site Pleasants Owner: Stephen R. and Janet Sue Westbrook

Start Date End Date Total Volume (gal) Max. daily purchase (gal) Intake Latitude: Intake Longitude:
11/1/2013 11/1/2014 5,000,000 39.384455 -81.25645

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

Max. Pump rate (gpm): 1,260 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 River @ Select Energy Pleasants Owner: Select Energy

Start Date End Date Total Volume (gal) Max. daily purchase (gal) Intake Latitude: Intake Longitude:
11/1/2013 11/1/2014 5,000,000 39.346473 -81.338727

Regulated Stream? Ohio River Min. Flow Ref. Gauge ID: 9999998 Ohio River Station: Racine Dam

Max. Pump rate (gpm): 1,500 Min. Gauge Reading (cfs): 7,216.00 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 Middle Island Creek @ Travis Truck Pad Doddridge Owner: Michael J. Travis

Start Date End Date Total Volume (gal) Max. daily purchase (gal) Intake Latitude: Intake Longitude:
11/1/2013 11/1/2014 5,000,000 39.308545 -80.781102

Regulated Stream? Ref. Gauge ID: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): 4,200 Min. Gauge Reading (cfs): 72.16 Min. Passby (cfs) 28.33

DEP Comments:

Source **Middle Island Creek @ Rock Run**

Doddridge

Owner: **017** **06391**  
**William Whitehill**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
11/1/2013	11/1/2014	5,000,000		39.298763	-80.760682

Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): **1,680** Min. Gauge Reading (cfs): **62.89** Min. Passby (cfs) **26.43**

DEP Comments:

Source **Middle Island Creek @ Barnes Withdrawal Site**

Doddridge

Owner: **Ellen L. Barnes**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
11/1/2013	11/1/2014	5,000,000		39.29958	-80.75694

Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): **1,260** Min. Gauge Reading (cfs): **59.06** Min. Passby (cfs) **26.39**

DEP Comments:

Source **Meathouse Fork @ Spiker Withdrawal Site**

Doddridge

Owner: **John & Sue Spiker**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
11/1/2013	11/1/2014	5,000,000		39.2591	-80.72489

Regulated Stream? Ref. Gauge ID: **3114500** MIDDLE ISLAND CREEK AT LITTLE, WV

Max. Pump rate (gpm): **1,260** Min. Gauge Reading (cfs): **74.77** Min. Passby (cfs) **9.26**

DEP Comments:



017

06391

I.L. Morris

Source **South Fork of Hughes River @ Upper Wizard Run**

Doddridge

Owner:

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
11/1/2013	11/1/2014	5,000,000		39.189998	-80.79511

Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WA

Max. Pump rate (gpm): 1,260 Min. Gauge Reading (cfs): 33.12 Min. Passby (cfs) 0.64

DEP Comments:

Source **South Fork of Hughes River @ Harmony Road**

Doddridge

Owner:

I.L. Morris

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
11/1/2013	11/1/2014	5,000,000		39.1962	-80.81442

Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WA

Max. Pump rate (gpm): 1,260 Min. Gauge Reading (cfs): 33.12 Min. Passby (cfs) 0.98

DEP Comments:

Source **Straight Fork @ Maxson Withdrawal Site**

Ritchie

Owner:

Douglas L. Maxson

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
11/1/2013	11/1/2014	5,000,000		39.144317	-80.848587

Regulated Stream? Ref. Gauge ID: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WA

Max. Pump rate (gpm): 1,680 Min. Gauge Reading (cfs): 36.74 Min. Passby (cfs) 2.45

DEP Comments:

Source **Middle Fork @ Janscheck Withdrawal Site**

Doddridge

Owner:

**017**

**06391**

**Mary Jo Janscheck**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
11/1/2013	11/1/2014	5,000,000		39.151388	-80.812222

Regulated Stream? Ref. Gauge ID: **3155220** SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WVA

Max. Pump rate (gpm): **840** Min. Gauge Reading (cfs): **35.81** Min. Passby (cfs) **0.86**

DEP Comments:

**Source Detail**

WMP-01606      API/ID Number: 047-017-06391      Operator: EQT Production Company  
 512482 (OXF149H5)

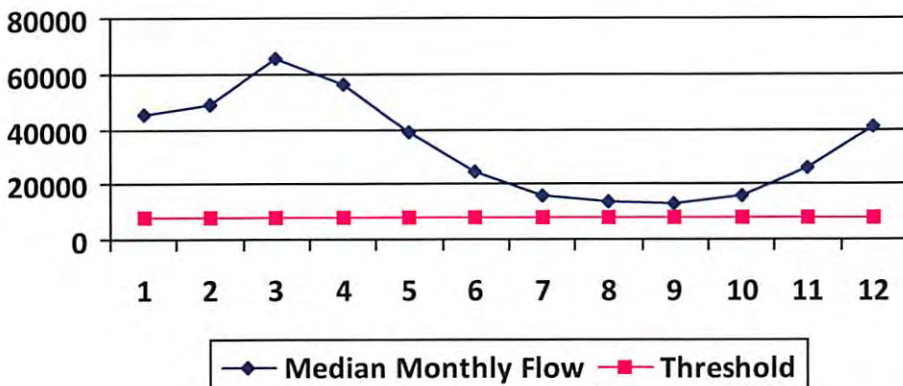
Source ID: 30289    Source Name: Ohio River @ Westbrook Trucking Site    Source Latitude: 39.384455  
 Stephen R. and Janet Sue Westbrook    Source Longitude: -81.25645  
 HUC-8 Code: 5030201  
 Drainage Area (sq. mi.): 25000    County: Pleasants    Anticipated withdrawal start date: 11/1/2013  
 Anticipated withdrawal end date: 11/1/2014  
 Total Volume from Source (gal): 5,000,000  
 Max. Pump rate (gpm): 1,260  
 Max. Simultaneous Trucks: 0  
 Max. Truck pump rate (gpm): 0

- Endangered Species?     Mussel Stream?
- Trout Stream?     Tier 3?
- Regulated Stream?    Ohio River Min. Flow
- Proximate PSD?
- 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): 0.00  
 Downstream Demand (cfs): 0.00  
 Pump rate (cfs): 2.81  
 Headwater Safety (cfs): 0.00  
 Ungauged Stream Safety (cfs): 1,617.00  
 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

017 06391

WMP-01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

Source ID: 30290 Source Name: Ohio River @ Select Energy  
Select Energy

Source Latitude: 39.346473  
Source Longitude: -81.338727

HUC-8 Code: 5030201

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

Anticipated withdrawal start date: 11/1/2013

Anticipated withdrawal end date: 11/1/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,500

Regulated Stream? Ohio River Min. Flow

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

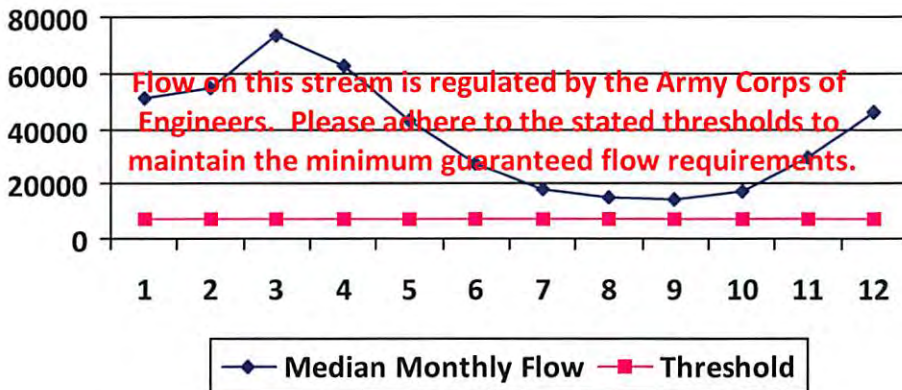
Reference Gaug: 9999998 Ohio River Station: Racine Dam

Drainage Area (sq. mi.): 25,000.00

Gauge Threshold (cfs): 7216

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	50,956.00	-	-
2	54,858.00	-	-
3	73,256.00	-	-
4	62,552.00	-	-
5	43,151.00	-	-
6	27,095.00	-	-
7	17,840.00	-	-
8	14,941.00	-	-
9	14,272.00	-	-
10	17,283.00	-	-
11	29,325.00	-	-
12	46,050.00	-	-

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	0.00
Pump rate (cfs):	3.34
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

017 06391

WMP-01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

Source ID: 30291 Source Name: Middle Island Creek @ Travis Truck Pad  
Michael J. Travis

Source Latitude: 39.308545  
Source Longitude: -80.781102

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 122.83 County: Doddridge

Anticipated withdrawal start date: 11/1/2013

Anticipated withdrawal end date: 11/1/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 4,200

Regulated Stream?

Max. Simultaneous Trucks: 10

Proximate PSD? West Union Municipal Water

Max. Truck pump rate (gpm): 420

Gauged Stream?

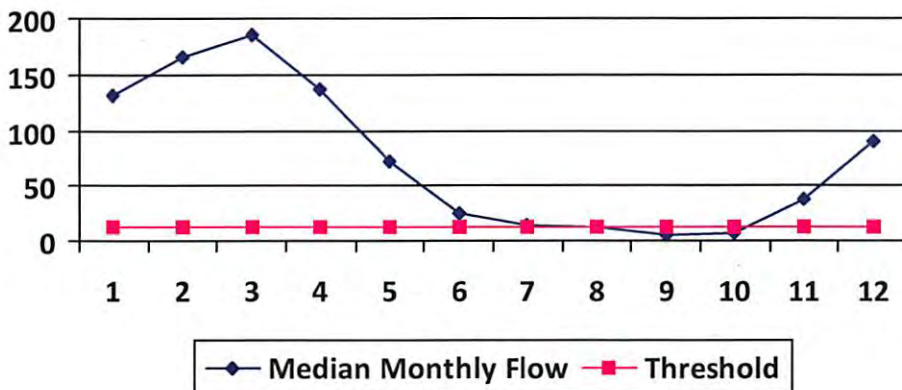
Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.): 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	131.72	30.99	101.10
2	165.69	30.99	135.07
3	185.40	30.99	154.78
4	137.68	30.99	107.05
5	72.63	30.99	42.00
6	25.36	30.99	-5.26
7	14.35	30.99	-16.27
8	11.82	30.99	-18.81
9	6.05	30.99	-24.57
10	7.60	30.99	-23.02
11	37.14	30.99	6.51
12	90.73	30.99	60.11

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	12.07
Upstream Demand (cfs):	6.55
Downstream Demand (cfs):	13.24
Pump rate (cfs):	9.36
Headwater Safety (cfs):	3.02
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	72.16
Passby at Location (cfs):	28.33

"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**

017 06391

WMP- 01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

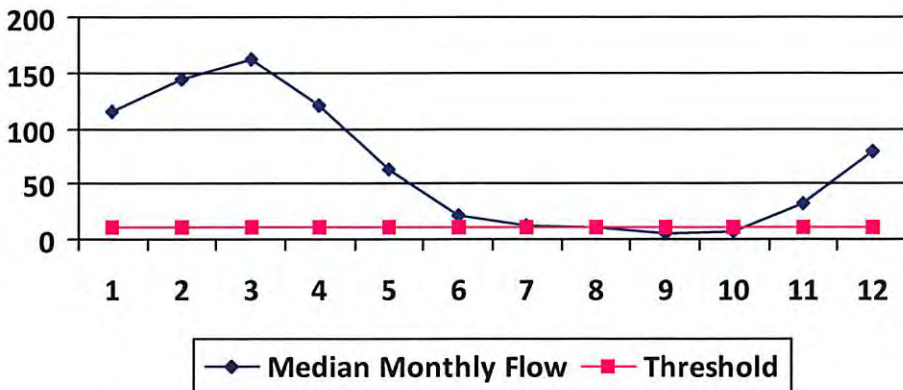
512482 (OXF149H5)

Source ID: 30292 Source Name: Middle Island Creek @ Rock Run Source Latitude: 39.298763  
 William Whitehill Source Longitude: -80.760682  
 HUC-8 Code: 5030201  
 Drainage Area (sq. mi.): 107.35 County: Doddridge  
 Anticipated withdrawal start date: 11/1/2013  
 Anticipated withdrawal end date: 11/1/2014  
 Total Volume from Source (gal): 5,000,000  
 Max. Pump rate (gpm): 1,680  
 Endangered Species?  Mussel Stream?  
 Trout Stream?  Tier 3?  
 Regulated Stream?  
 Proximate PSD? West Union Municipal Water  
 Gauged Stream? Max. Simultaneous Trucks: 4  
 Max. Truck pump rate (gpm): 420

Reference Gaug: 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV  
 Drainage Area (sq. mi.): 458.00 Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	115.12	19.74	95.58
2	144.81	19.74	125.27
3	162.04	19.74	142.50
4	120.33	19.74	100.79
5	63.47	19.74	43.93
6	22.17	19.74	2.63
7	12.54	19.74	-7.00
8	10.33	19.74	-9.21
9	5.29	19.74	-14.25
10	6.65	19.74	-12.89
11	32.46	19.74	12.91
12	79.30	19.74	59.76

**Water Availability Profile**



**Water Availability Assessment of Location**

Base Threshold (cfs): 10.55  
 Upstream Demand (cfs): 2.81  
 Downstream Demand (cfs): 13.24  
 Pump rate (cfs): 3.74  
 Headwater Safety (cfs): 2.64  
 Ungauged Stream Safety (cfs): 0.00  
 Min. Gauge Reading (cfs): 62.80  
 Passby at Location (cfs): 26.42

"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

017 06391

WMP- 01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

Source ID: 30293 Source Name Middle Island Creek @ Barnes Withdrawal Site  
Ellen L. Barnes

Source Latitude: 39.29958  
Source Longitude: -80.75694

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 107.08 County: Doddridge

Anticipated withdrawal start date: 11/1/2013

Anticipated withdrawal end date: 11/1/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,260

Regulated Stream?

Proximate PSD? West Union

Max. Simultaneous Trucks: 0

Gauged Stream?

Max. Truck pump rate (gpm): 0

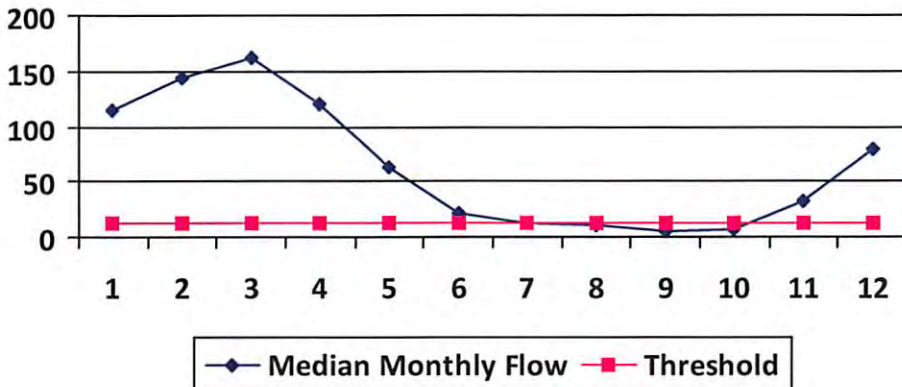
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	114.83	18.59	96.42
2	144.45	18.59	126.03
3	161.63	18.59	143.21
4	120.02	18.59	101.61
5	63.31	18.59	44.90
6	22.11	18.59	3.69
7	12.51	18.59	-5.91
8	10.30	18.59	-8.12
9	5.28	18.59	-13.14
10	6.63	18.59	-11.79
11	32.37	18.59	13.96
12	79.10	18.59	60.68

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	10.52
Upstream Demand (cfs):	0.00
Downstream Demand (cfs):	13.24
Pump rate (cfs):	2.81
Headwater Safety (cfs):	2.63
Ungauged Stream Safety (cfs):	2.63
Min. Gauge Reading (cfs):	70.31
Passby at Location (cfs):	29.02

"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

017 06391

WMP- 01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

Source ID: 30294 Source Name Meathouse Fork @ Spiker Withdrawal Site  
John & Sue Spiker

Source Latitude: 39.2591  
Source Longitude: -80.72489

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 62.75 County: Doddridge

Anticipated withdrawal start date: 11/1/2013

Anticipated withdrawal end date: 11/1/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,260

Regulated Stream?

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm) 0

Gauged Stream?

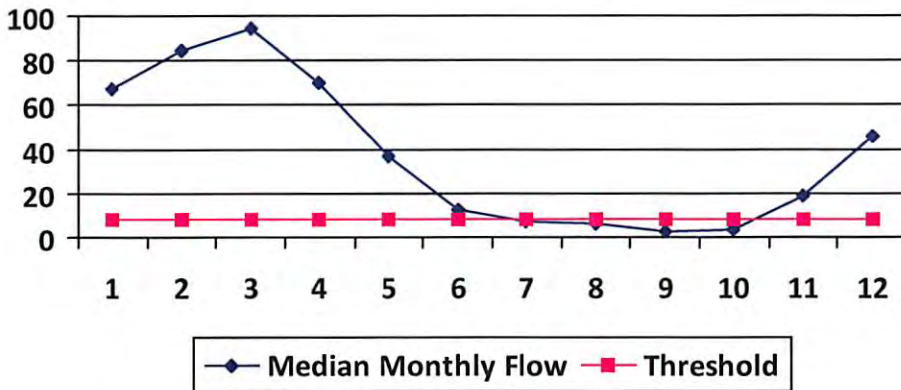
Reference Gaug 3114500 MIDDLE ISLAND CREEK AT LITTLE, WV

Drainage Area (sq. mi.) 458.00

Gauge Threshold (cfs): 45

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	67.29	16.52	51.09
2	84.65	16.52	68.45
3	94.72	16.52	78.52
4	70.34	16.52	54.14
5	37.10	16.52	20.90
6	12.96	16.52	-3.24
7	7.33	16.52	-8.87
8	6.04	16.52	-10.16
9	3.09	16.52	-13.11
10	3.88	16.52	-12.32
11	18.97	16.52	2.77
12	46.35	16.52	30.15

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 6.17

Upstream Demand (cfs): 4.46

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.81

Headwater Safety (cfs): 1.54

Ungauged Stream Safety (cfs): 1.54

Min. Gauge Reading (cfs): 74.77

Passby at Location (cfs): 9.25

"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

017 06391

WMP-01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

Source ID: 30295 Source Name: South Fork of Hughes River @ Upper Wizard Run  
I.L. Morris

Source Latitude: 39.189998  
Source Longitude: -80.79511

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 5.33 County: Doddridge

Anticipated withdrawal start date: 11/1/2013

Anticipated withdrawal end date: 11/1/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,260

Regulated Stream?

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm): 0

Gauged Stream?

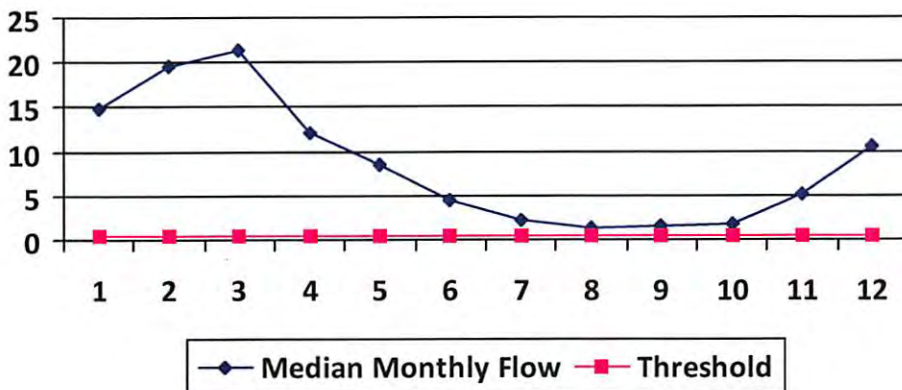
Reference Gaug: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	14.97	6.26	8.79
2	19.52	6.26	13.33
3	21.37	6.26	15.19
4	12.08	6.26	5.90
5	8.48	6.26	2.29
6	4.56	6.26	-1.63
7	2.26	6.26	-3.93
8	1.31	6.26	-4.88
9	1.57	6.26	-4.62
10	1.70	6.26	-4.48
11	5.09	6.26	-1.09
12	10.51	6.26	4.32

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 0.51

Upstream Demand (cfs): 2.81

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.81

Headwater Safety (cfs): 0.13

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 33.12

Passby at Location (cfs): 0.64

"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

017 06391

WMP- 01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

Source ID: 30296 Source Name South Fork of Hughes River @ Harmony Road  
I.L. Morris

Source Latitude: 39.1962

Source Longitude: -80.81442

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 8.1 County: Doddridge

Anticipated withdrawal start date: 11/1/2013

Anticipated withdrawal end date: 11/1/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,260

Regulated Stream?

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm) 0

Gauged Stream?

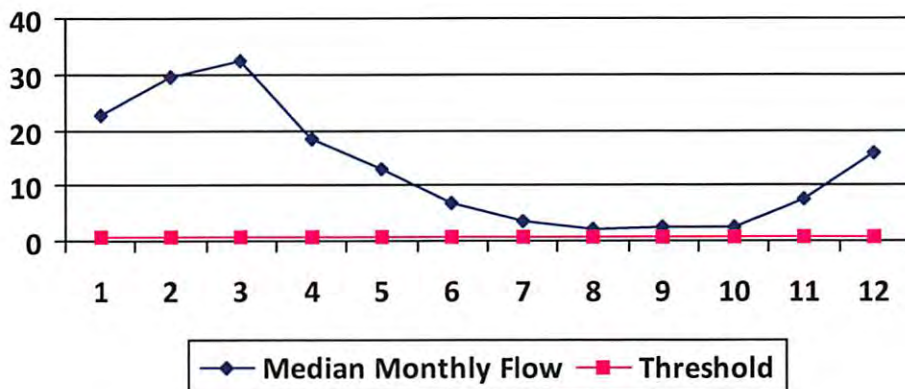
Reference Gaug 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.) 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	22.75	6.59	16.28
2	29.66	6.59	23.19
3	32.48	6.59	26.01
4	18.36	6.59	11.89
5	12.88	6.59	6.41
6	6.92	6.59	0.45
7	3.43	6.59	-3.04
8	1.98	6.59	-4.49
9	2.38	6.59	-4.09
10	2.59	6.59	-3.88
11	7.74	6.59	1.27
12	15.97	6.59	9.50

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 0.78

Upstream Demand (cfs): 2.81

Downstream Demand (cfs): 0.00

Pump rate (cfs): 2.81

Headwater Safety (cfs): 0.19

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 33.12

Passby at Location (cfs): 0.97

"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

017 06391

WMP-01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

Source ID: 30297 Source Name: Straight Fork @ Maxson Withdrawal Site  
Douglas L. Maxson

Source Latitude: 39.144317  
Source Longitude: -80.848587

HUC-8 Code: 5030203

Drainage Area (sq. mi.): 16.99 County: Ritchie

Anticipated withdrawal start date: 11/1/2013

Anticipated withdrawal end date: 11/1/2014

Endangered Species?  Mussel Stream?

Total Volume from Source (gal): 5,000,000

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,680

Regulated Stream?

Max. Simultaneous Trucks: 4

Proximate PSD?

Max. Truck pump rate (gpm): 420

Gauged Stream?

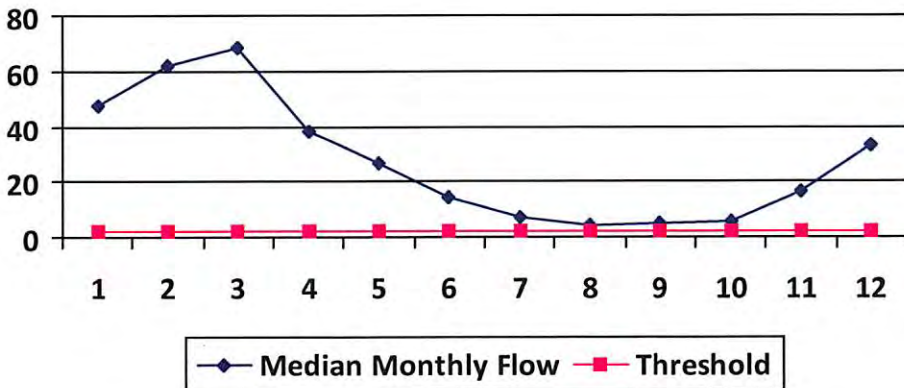
Reference Gaug: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV

Drainage Area (sq. mi.): 229.00

Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	47.72	6.19	41.62
2	62.22	6.19	56.12
3	68.13	6.19	62.04
4	38.52	6.19	32.42
5	27.03	6.19	20.93
6	14.52	6.19	8.42
7	7.20	6.19	1.10
8	4.16	6.19	-1.94
9	5.00	6.19	-1.10
10	5.43	6.19	-0.67
11	16.23	6.19	10.13
12	33.50	6.19	27.40

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs): 1.63

Upstream Demand (cfs): 0.00

Downstream Demand (cfs): 0.00

Pump rate (cfs): 3.74

Headwater Safety (cfs): 0.41

Ungauged Stream Safety (cfs): 0.41

Min. Gauge Reading (cfs): 36.74

Passby at Location (cfs): 2.45

"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**

017 06391

WMP- 01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

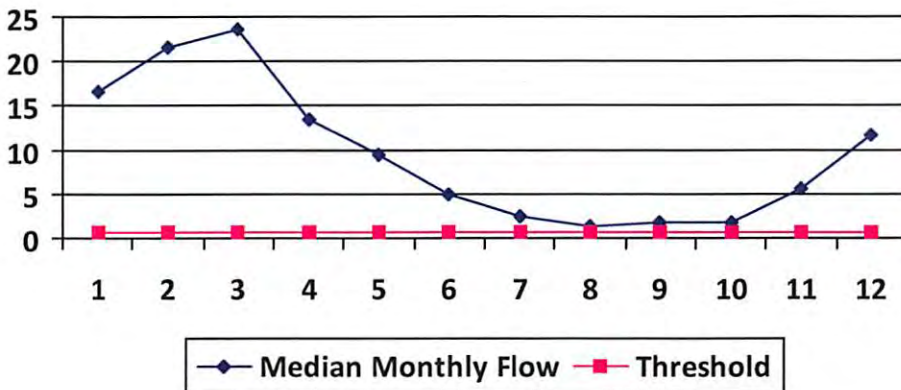
Source ID: 30298 Source Name: Middle Fork @ Janscheck Withdrawal Site Source Latitude: 39.151388  
 Mary Jo Janscheck Source Longitude: -80.812222  
 HUC-8 Code: 5030203  
 Drainage Area (sq. mi.): 5.92 County: Doddridge  
 Anticipated withdrawal start date: 11/1/2013  
 Anticipated withdrawal end date: 11/1/2014  
 Total Volume from Source (gal): 5,000,000  
 Max. Pump rate (gpm): 840  
 Max. Simultaneous Trucks:  
 Max. Truck pump rate (gpm):

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

Reference Gaug: 3155220 SOUTH FORK HUGHES RIVER BELOW MACFARLAN, WV  
 Drainage Area (sq. mi.): 229.00 Gauge Threshold (cfs): 22

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	16.63	2.72	14.03
2	21.68	2.72	19.08
3	23.74	2.72	21.14
4	13.42	2.72	10.83
5	9.42	2.72	6.82
6	5.06	2.72	2.46
7	2.51	2.72	-0.09
8	1.45	2.72	-1.15
9	1.74	2.72	-0.85
10	1.89	2.72	-0.70
11	5.66	2.72	3.06
12	11.67	2.72	9.08

**Water Availability Profile**



**Water Availability Assessment of Location**

Base Threshold (cfs): 0.57  
 Upstream Demand (cfs): 0.00  
 Downstream Demand (cfs): 0.00  
 Pump rate (cfs): 1.87  
 Headwater Safety (cfs): 0.14  
 Ungauged Stream Safety (cfs): 0.14  
 Min. Gauge Reading (cfs): 34.87  
 Passby at Location (cfs): 0.85

"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-01606	API/ID Number	047-017-06391	Operator:	EQT Production Company
		512482 (OXF149H5)		

**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.

### Ground Water

Source ID:	30299	Source Name	Groundwater Well TW#1		Source start date:	11/1/2013
					Source end date:	11/1/2014
	Source Lat:	39.56059	Source Long:	-80.56027	County	Wetzel
	Max. Daily Purchase (gal)				Total Volume from Source (gal):	5,000,000
DEP Comments:						

WMP-01606

API/ID Number 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

**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.

**Lake/Reservoir**

Source ID:	30300	Source Name	Pennsboro Lake		Source start date:	11/1/2013
					Source end date:	11/1/2014
Source Lat:	39.281689	Source Long:	-80.925526	County	Ritchie	
Max. Daily Purchase (gal)				Total Volume from Source (gal):	5,000,000	

DEP Comments:

WMP-01606

API/ID Number: 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

**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:	30301	Source Name	Davies Centralized Freshwater Impoundment		Source start date:	11/1/2013
					Source end date:	11/1/2014
Source Lat:	39.269635	Source Long:	-80.77711	County	Doddridge	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,000,000			

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-1083

Source ID:	30302	Source Name	OXF149 Tank Pad A		Source start date:	11/1/2013
					Source end date:	11/1/2014
Source Lat:	39.221932	Source Long:	-80.799873	County	Doddridge	
Max. Daily Purchase (gal)		Total Volume from Source (gal):	5,000,000			

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-1532

WMP-01606

API/ID Number 047-017-06391

Operator: EQT Production Company

512482 (OXF149H5)

**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:	30303	Source Name	OXF149 Tank Pad B		Source start date:	11/1/2013	
					Source end date:	11/1/2014	
		Source Lat:	39.221733	Source Long:	-80.798991	County	Doddridge
		Max. Daily Purchase (gal)		Total Volume from Source (gal):		5,000,000	

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.

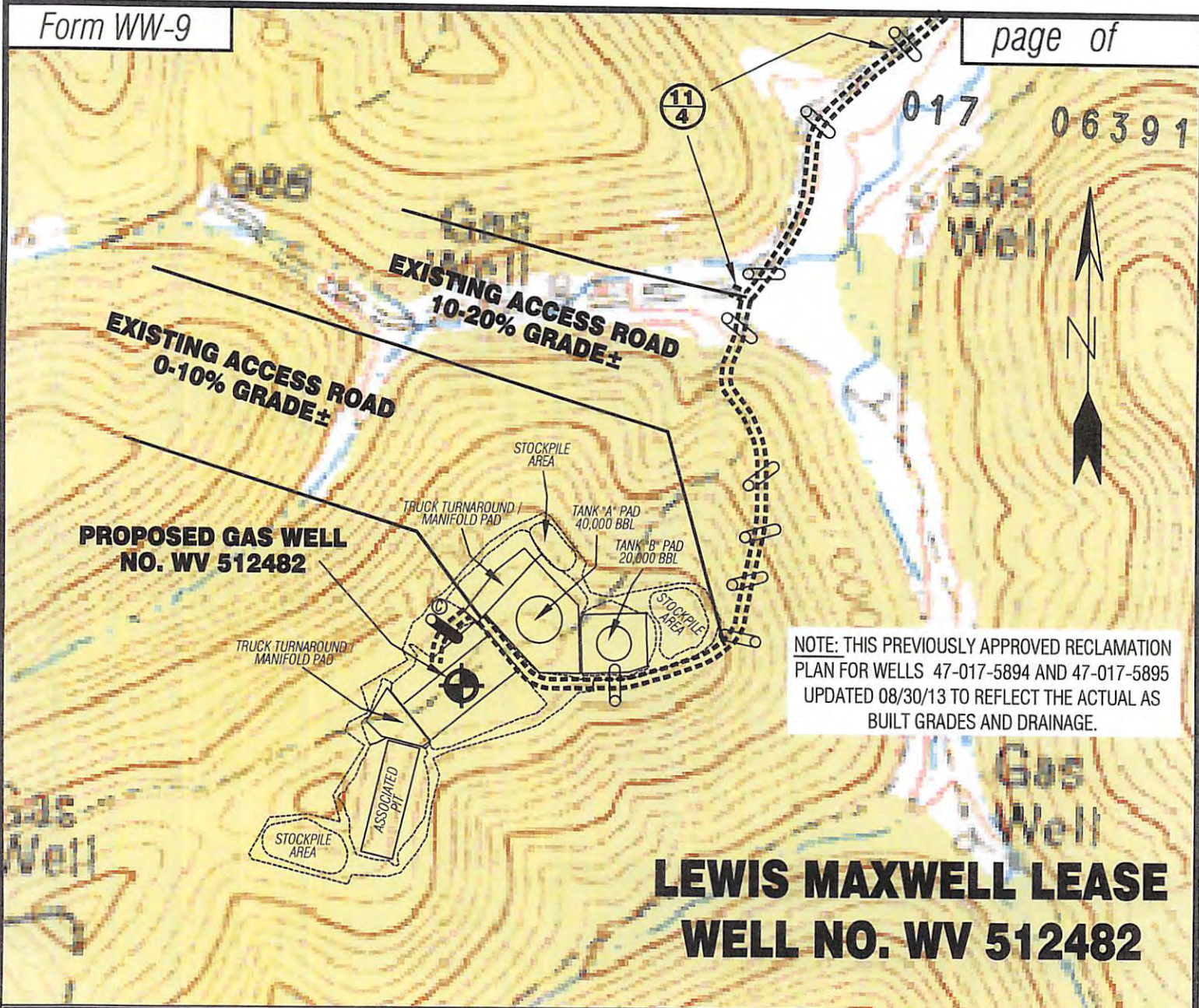
Reference: WMP-1533

**Recycled Frac Water**

Source ID:	30304	Source Name	Various		Source start date:	11/1/2013	
					Source end date:	11/1/2014	
		Source Lat:		Source Long:		County	
		Max. Daily Purchase (gal)		Total Volume from Source (gal):		5,000,000	

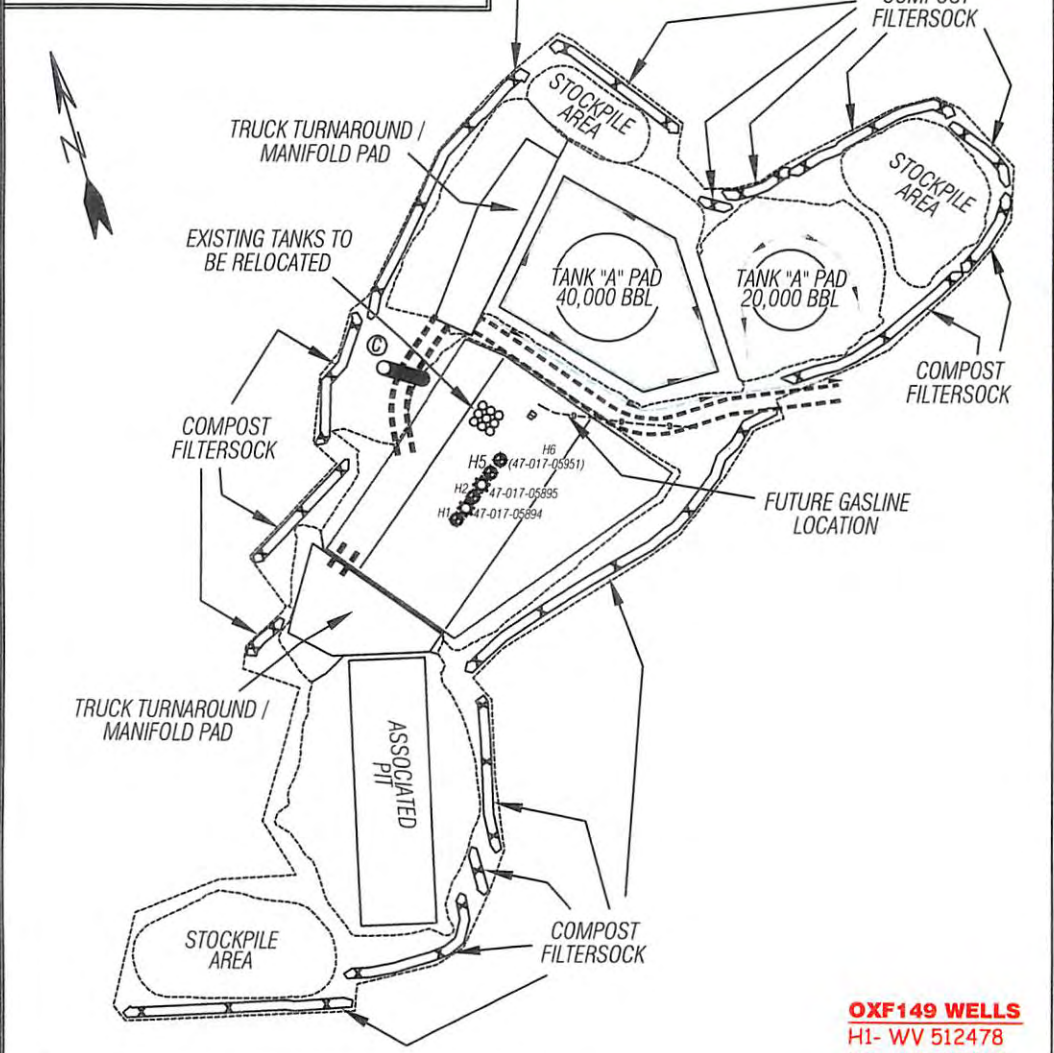
DEP Comments:





# LEWIS MAXWELL LEASE WELL NO. WV 512482

Detail Sketch for Proposed Well WV 512482



ALL ROADS SHOWN HEREON ARE EXISTING UNLESS OTHERWISE NOTED AND SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.E.P. OIL AND GAS BMP MANUAL ENTRANCES AT COUNTY/STATE ROADS SHALL BE MAINTAINED IN ACCORDANCE WITH WV D.O.T. REGULATION SEPARATE PERMITS MAY BE REQUIRED BY THE D.O.T.

SEDIMENT BASINS (TRAPS) AND APPROPRIATE EROSION CONTROL BARRIERS ARE TO BE CONSTRUCTED AT ALL CULVERT AND CROSS DRAIN INLETS AND OUTLETS AS REQUIRED IN THE WV D.E.P. OIL AND GAS BMP MANUAL. FIELD CONDITIONS (ROCK OUTCROPS AND BEDROCK) MAY PROHIBIT INLET TRAPS BEING INSTALLED. WHEN THESE CONDITIONS EXIST ADDITIONAL EROSION CONTROL MEASURES SHALL BE EVALUATED AND UTILIZED AS NEEDED.

EARTHWORK CONTRACTORS ARE RESPONSIBLE FOR NOTIFICATION TO THE OPERATOR AND INSPECTOR PRIOR TO ANY DEVIATION FROM THIS PLAN.

TEMPORARY SEED & MULCH ALL SLOPES AFTER CONSTRUCTION OF LOCATION.

CUT & STACK ALL MARKETABLE TIMBER.

STACKS & BRUSH MAY BE USED FOR SEDIMENT CONTROL.

APPLICATIONS FOR SEPARATE PEC PERMITS ON THE ACCESS ROAD STREAM CROSSINGS HAVE BEEN PREPARED (IF APPLIES).

- = EXISTING CULVERT
- = EXISTING CULVERT TO BE UPGRADED TO A 12" MIN. UNLESS OTHERWISE NOTED
- = PROPOSED STREAM CROSSING (IF APPLIES) \*SEE TABLE FOR CULVERT DETAIL
- = EXISTING BROAD BASED DIP

- OXF149 WELLS**
- H1- WV 512478
  - H2- WV 512479
  - H3- WV 512480
  - H4- WV 512481
  - H5- WV 512482**
  - H6- WV 513136

NOT TO SCALE

TOPO SECTION OF USGS  
OXFORD 7.5' QUADRANGLE

**Professional Energy Consultants**  
A DIVISION OF SMITH LAND SURVEYING

**SURVEYORS**  
PROJECT MGMT.

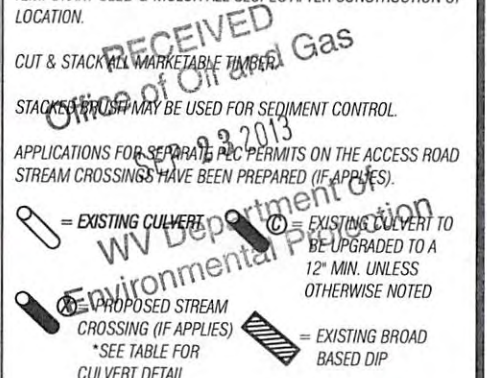
**ENGINEERS**  
ENVIRONMENTAL

226 West Main St.  
P.O. Box 150  
Glenville, WV 26031  
(304) 452-5834

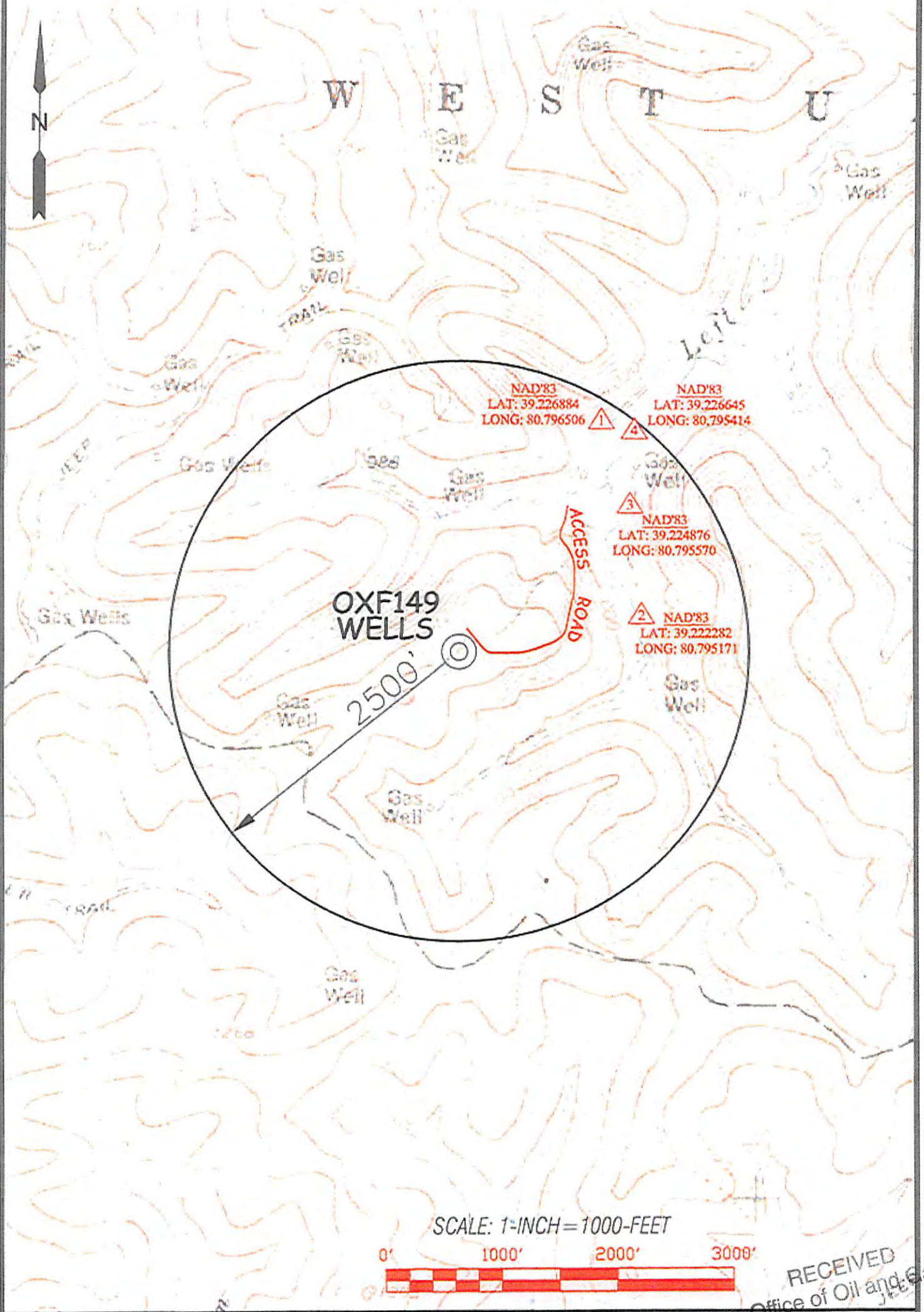
50605 Olives Bottom Road  
Shady Side, OH 43087  
(740) 671-9911

HONESTY. INTEGRITY. QUALITY

DRAWN BY K.D.W.	FILE NO. 6980	DATE 08/30/13	CADD FILE: 6980REC\WV512482R3.DWG
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# LEWIS MAXWELL LEASE OXF149 WELLS



SCALE: 1-INCH=1000-FEET



RECEIVED  
Office of Oil and Gas  
SEP 28 2013  
WV Department of Environmental Protection

		TOPO SECTION OF: OXFORD, WV 7.5' QUAD.		OPERATOR: EQT PRODUCTION COMPANY 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330		
DRAWN BY	FILE NO.	DATE	CADD FILE:	DISTRICT	COUNTY	TAX MAP-PARCEL NO.
K.D.W.	6980	09/12/13	6980WS51247BR2	WEST UNION	DODDRIDGE	23-3.1

# LEWIS MAXWELL LEASE

## 2654 ACRES ±

### WELL NO. WV 512482

LATITUDE 39° 15' 00"  
NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES AND CORNERS ARE BASED ON GRID NORTH FOR THE WV STATE PLANE COORDINATE SYSTEM NORTH ZONE NAD'27.
2. LEASE BOUNDARY SHOWN HEREON TAKEN FROM DEED BOOK 28 PAGE 177.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF DODDRIDGE COUNTY IN JULY, 2013.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE).
5. PLAT DATED 03/11/10 REVISED 12/26/12 TO EXTEND HORIZONTAL LEG AND CHANGE BOTTOM HOLE COORDINATES, REVISED 06/06/13 TO SHOW NEW TOP HOLE COORDINATES, REVISED 08/12/13 TO CONFORM TO WV CODE R. 35-8 ETC.

LONGITUDE 80° 47' 30"

**BOTTOM HOLE**  
WELL NO. WV 512482  
STATE PLANE COORDINATES  
(NORTH ZONE) NAD'27

N. 268,620.4  
E. 1,630,973.0

LAT=(N) 39.230175  
LONG=(W) 80.802735

UTM (NAD83)(METERS)  
N. 4,342,347.8  
E. 517,041.0

HAESSLY LAND &  
TIMBER, LLC  
266.38 ACRES±

ZOE K. WALTERS  
261 ACRES±

BOTTOM HOLE  
WELL NO. WV 512482

HAESSLY LAND &  
TIMBER, LLC  
485 ACRES±

WILLIAM RANDALL  
HAMBLET, ET AL  
442.60 ACRES±  
TM 23-3.1

LANDING POINT  
WELL NO. WV 512482  
STATE PLANE COORDINATES  
(NORTH ZONE) NAD'27

N. 266,073.6  
E. 1,632,160.6

LAT=(N) 39.223231  
LONG=(W) 80.798413

UTM (NAD83)(METERS)  
N. 4,341,578.0  
E. 517,415.7

WELL NO. WV 512482  
STATE PLANE COORDINATES  
(NORTH ZONE) NAD'27

N. 265,368.5  
E. 1,631,450.3

LAT=(N) 39.221267  
LONG=(W) 80.800884

UTM (NAD83)(METERS)  
N. 4,341,359.6  
E. 517,202.9

### REFERENCES

017-2991

LUCY E. HARPER  
442.60 ACRES±  
TM 23-03

S 06°10' W  
2822.73'

WELL NO.  
WV 512482

HAESSLY LAND &  
TIMBER, LLC  
615 ACRES±

I.L. MORRIS  
6,603.75 ACRES±

WEST UNION  
DISTRICT

SOUTHWEST  
DISTRICT

HAMBLET  
H4  
(47-017-5895-H)  
H2  
H3  
(47-017-5894-H)  
H1  
HARPER

OXF149 WELLS  
H1-WV 512478  
H2-WV 512479  
H3-WV 512480  
H4-WV 512481  
**H5-WV 512482**  
H6-WV 513136

1" = 50'

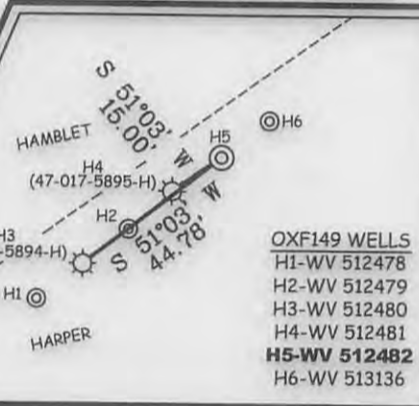
NORTH

FENCE POST  
FOUND

STONE  
FOUND

SURFACE  
BOUNDARY

LEFT  
FORK



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 DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 677  
*Gregory A. Smith*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.  
DATE AUGUST 29, 20 13  
OPERATORS WELL NO. WV 512482  
API WELL NO. 47-017-06391 H6A  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 6980P512482R7 (280-67)  
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 1,000'

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



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

LOCATION: ELEVATION 1,240'(GROUND) 1,242.5'(PROPOSED) WATERSHED LEFT FORK

DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'

SURFACE OWNER LUCY E. HARPER ACREAGE 442.6±

ROYALTY OWNER LEWIS MAXWELL HEIRS LEASE ACREAGE 2,654±

PROPOSED WORK: DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE  PLUG OFF OLD

FORMATION  PERFORATE NEW FORMATION  PLUG AND ABANDON  CLEAN OUT AND REPLUG  OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ TARGET FORMATION MARCELLUS

ESTIMATED DEPTH \_\_\_\_\_

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY

ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME PERMIT