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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

September 10, 2013

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-9101284, 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: 514160  
Farm Name: GREENWOOD LAND INC.  
**API Well Number: 47-9101284**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 09/10/2013

**Promoting a healthy environment.**

**09/13/2013**

# 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

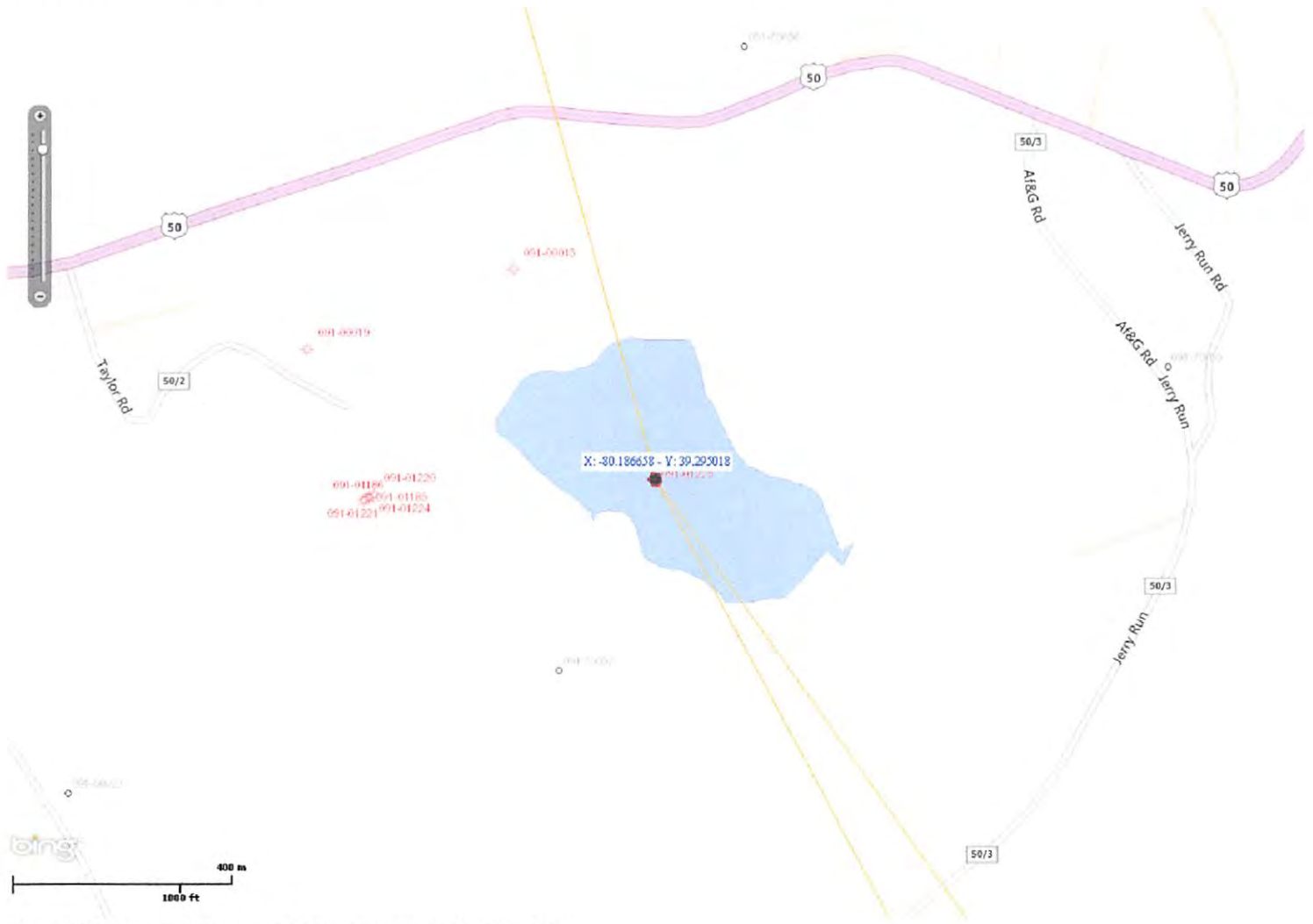
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1. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (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.
2. 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% (unless soil test results show a greater range of moisture content is appropriate and 95% compaction can still be achieved) 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.

91-01284

# Map from a Flex Viewer application

Powered by ArcGIS



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drilling in potentially mined-out area

LKC

09/13/2013

91-01284

WW - 6B  
(3/13)

**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

	91	4	588
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Operator ID      County      District      Quadrangle

2) Operator's Well Number: 514160      Well Pad Name: RSM135

3 Elevation, current ground: 1632'      Elevation, proposed post-construction: 1615'

4) Well Type: (a) Gas       Oil       Underground Storage   
Other \_\_\_\_\_

(b) If Gas:      Shallow       Deep   
                         Horizontal

5) Existing Pad? Yes or No: no

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Target formation is Marcellus at a depth of 7,591 with the anticipated thickness to be 134 feet and anticipated target pressure of 5189 PSI

7) Proposed Total Vertical Depth: 7,591

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 15,900

10) Approximate Fresh Water Strata Depths: 429', 743', 974'

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

12) Approximate Saltwater Depths: none reported

13) Approximate Coal Seam Depths: 177', 748', 793', 926', 971, 1041'

14) Approximate Depth to Possible Void (coal mine, karst, other): 177' Pittsburgh Coal UKC  
15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of Mine: n/a

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 5,807', then kick off the horizontal leg into the Marcellus using a slick water frac. If an open mine void is encountered, EQT will set and cement a dedicated coal protection casing string. The hole will be drilled no more than 100' below the mine void. Cement basket(s) and centralizers will be run to facilitate cementing the coal protection casing string to surface. ✓

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 400,000 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): 31.51±

19) Area to be disturbed for well pad only, less access road (acres): 22.38

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Office of Oil and Gas

09/13/2013

AUG 30 2013

WV Department of  
Environmental Protection

**CASING AND TUBING PROGRAM**

*UKC 9/9/13*

20)

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: for Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill-up (Cu.Ft.)</u>
Conductor	26	New	MC-50	varies	40	40	49/CTS
Fresh Water	13 3/8	New	MC-50	54	1,074	1,074	930/CTS
Coal	20	New	MC-50	81	235	235	297/CTS
Intermediate	9 5/8	New	MC-50	40	2,649	2,649	1030/CTS
Production	5 1/2	New	P-110	20	15,900	15,900	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TD
Liners							

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield</u>
Conductor	26	30	0.5	-	Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	1	1.21
Coal	20	24	0.635	1,640	1	1.2
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.

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2 09/13/2013

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 % Calcuim 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.

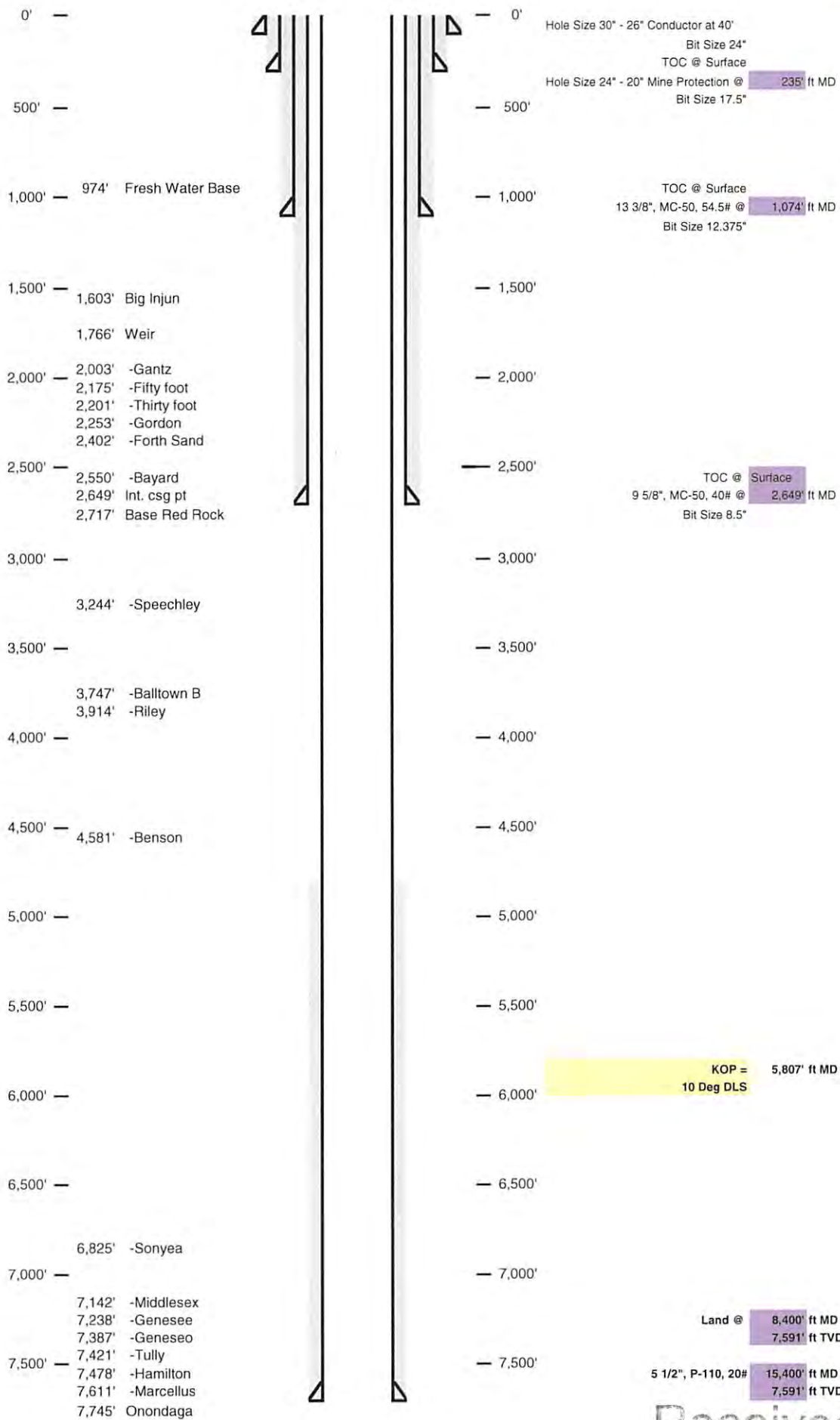
\*Note: Attach additional sheets as needed.

Received

Well Schematic  
EQT Production

Well Name 514160 (RSM135H4)  
County Taylor  
State West Virginia

Elevation KB: 1625  
Target Marcellus  
Prospect  
Azimuth 155  
Vertical Section 7440



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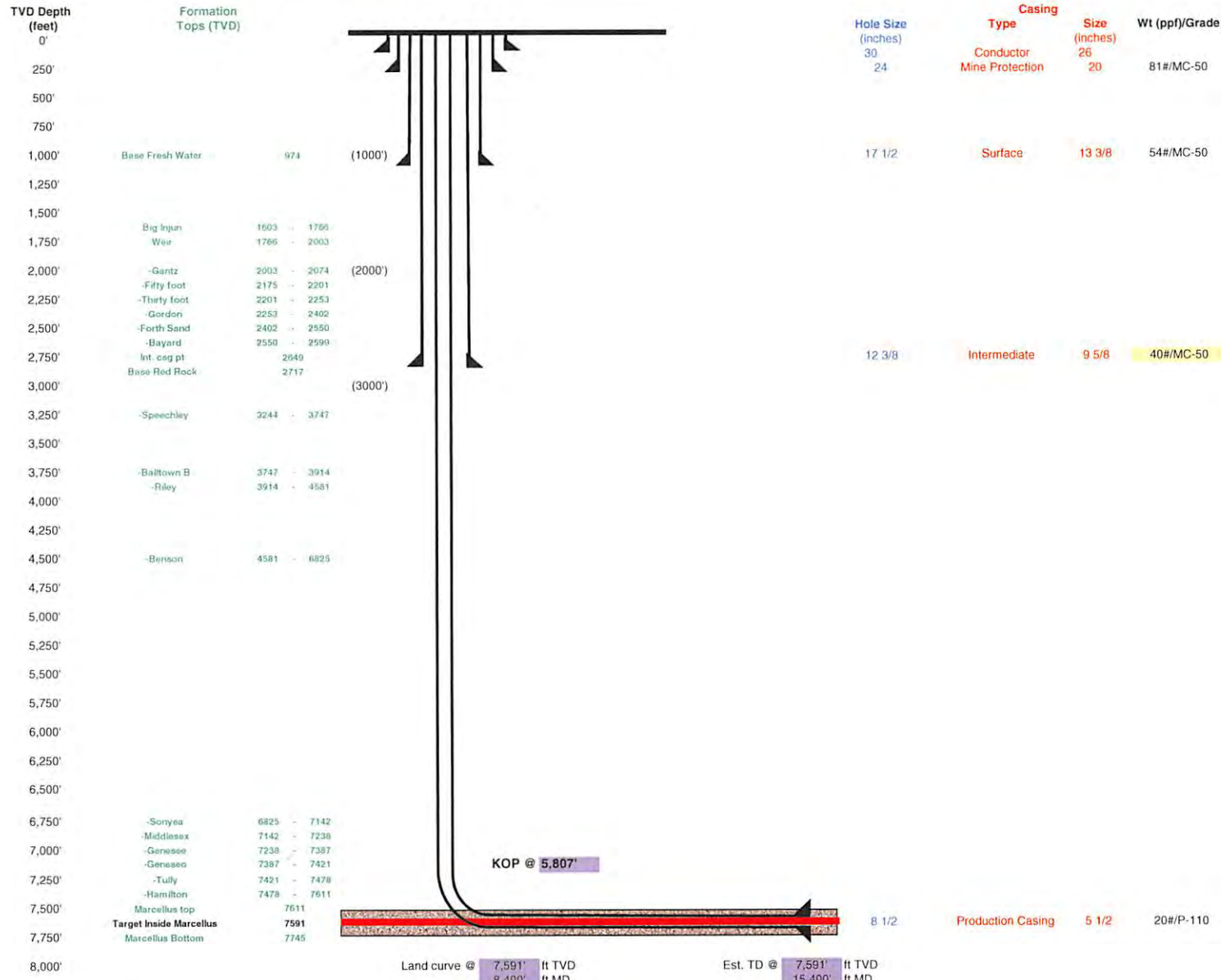
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4709101284

Well 514160 (RSM135H4)  
 EQT Production  
 Rosemont  
 Taylor West Virginia

Azimuth 155  
 Vertical Section 7440



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 5807'.  
 Then kick of the horizontal leg into the Marcellus using a slick water frac.

Land curve @ 7,591' ft TVD / 8,400' ft MD  
 Est. TD @ 7,591' ft TVD / 15,400' ft MD  
 7,000' ft Lateral

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6-12-11

Office of Oil and Gas  
 WV Dept. of Environmental Protection



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

**CONSTRUCTION AND RECLAMATION PLAN AND SITE REGISTRATION APPLICATION FORM**  
**GENERAL PERMIT FOR OIL AND GAS PIT WASTE DISCHARGE**

Operator Name RSM135 OP Code \_\_\_\_\_

Watershed (HUC10) Tributary of Peddlar Run Quadrangle Rosemont 7.5'

Elevation 1,615' County Taylor District Flemington

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:  Pit for flowback fluids LKC

If so please describe anticipated pit waste: \_\_\_\_\_

Will a synthetic liner be used in the pit? Yes \_\_\_\_\_ No \_\_\_\_\_ 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 \_\_\_\_\_ )

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,

Deflocculant, 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 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.

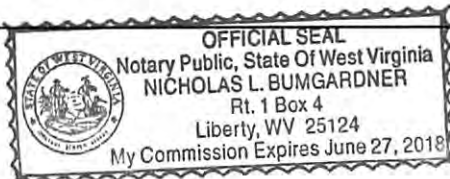
I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is 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 *Victoria J. Roark*  
Company Official (Typed Name) Victoria J. Roark  
Company Official Title Permitting Supervisor

Subscribed and sworn before me this 3 day of MAY, 20 13

Notary Public

My commission expires 6/27/2018



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Office of Oil 09/13/2013

<b>EQT Production Water plan</b> <b>Offsite disposals for Marcellus wells</b>
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**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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 Office of Oil & Gas

09/13/2013

WW-9

API No. 47 - 091 - 0  
Operator's Well No. 514160

Proposed Revegetation Treatment: Acres Disturbed 31.51± Prevegetation pH 6.2

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: JF McCourt

Comments: Ed S controls in place at all times and before sig mines

Title: Inspector Date: 6-6-13

Field Reviewed? ( X ) Yes ( ) No

Received 09/15/2013

JUN 12 2013



## Water Management Plan: Primary Water Sources



WMP- 01324

API/ID Number: 047-091-01284

Operator:

EQT Production Company

514160 (RSM135H4)

### 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 AUG 21 2013

09/13/2013

## Source Summary

WMP-01324

API Number:

047-091-01284

Operator:

EQT Production Company

514160 (RSM135H4)

## Stream/River

● Source **Tygart River @ Kuhnes Withdrawal Site A** Taylor Owner: **Charlie & Peggy Kuhnes**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/1/2013	8/1/2014	8,500,000		39.35692	-80.05474

Regulated Stream? Tygart Valley Dam Ref. Gauge ID: 3057000 TYGART VALLEY RIVER AT COLFAX, WV

Max. Pump rate (gpm): **1,260** Min. Gauge Reading (cfs): **404.79** Min. Passby (cfs) **392.62**

DEP Comments:

## Source Summary

WMP- 01324

API Number: 047-091-01284  
514160 (RSM135H4)

Operator: EQT Production Company

### Purchased Water

● Source **Mountain View Water Assoc.** Barbour Owner: **Mountain View Water Association**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/1/2013	8/1/2014		300,000	-	-

Regulated Stream? Ref. Gauge ID: 3054500 TYGART VALLEY RIVER AT PHILIPPI, WV

Max. Pump rate (gpm): 0 Min. Gauge Reading (cfs): 352.81 Min. Passby (cfs)

DEP Comments:

● Source **Southwestern Water District** Barbour Owner: **Southwestern Water District**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
8/1/2013	8/1/2014		300,000	-	-

Regulated Stream? Ref. Gauge ID: 3054500 TYGART VALLEY RIVER AT PHILIPPI, WV

Max. Pump rate (gpm): 0 Min. Gauge Reading (cfs): 352.81 Min. Passby (cfs)

DEP Comments:

09/13/2013

## Source Detail

WMP- 01324

API/ID Number: 047-091-01284

Operator: EQT Production Company

514160 (RSM135H4)

Source ID: 20361 Source Name Mountain View Water Assoc.  
Mountain View Water Association

Source Latitude: -  
Source Longitude: -

HUC-8 Code: 5020001

Drainage Area (sq. mi.): 929.63 County: Barbour

Anticipated withdrawal start date: 8/1/2013

Anticipated withdrawal end date: 8/1/2014

Endangered Species?  Mussel Stream?

Trout Stream?  Tier 3?

Regulated Stream?

Proximate PSD? Taylor County PSD

Gauged Stream?

Total Volume from Source (gal):

Max. Pump rate (gpm): 0

Max. Simultaneous Trucks:

Max. Truck pump rate (gpm)

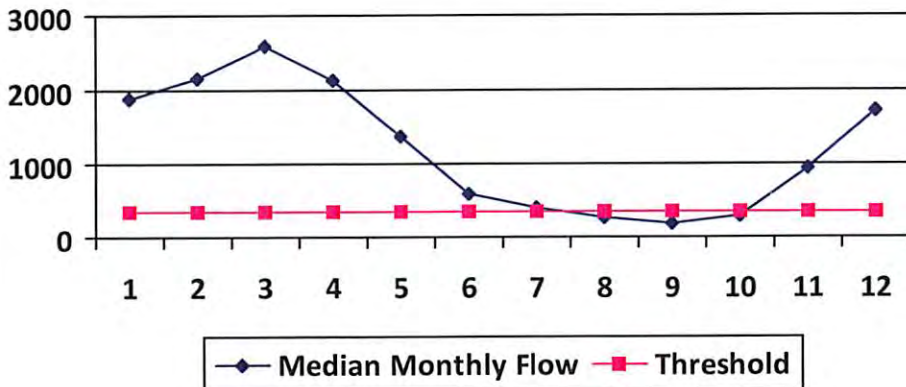
Reference Gaug 3054500 TYGART VALLEY RIVER AT PHILIPPI, WV

Drainage Area (sq. mi.) 914.00

Gauge Threshold (cfs): 341

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,897.38	358.64	1,541.16
2	2,151.34	358.64	1,795.12
3	2,595.90	358.64	2,239.68
4	2,128.11	358.64	1,771.89
5	1,372.82	358.64	1,016.60
6	584.97	358.64	228.75
7	401.23	358.64	45.01
8	280.03	358.64	-76.19
9	177.08	358.64	-179.14
10	286.20	358.64	-70.02
11	949.06	358.64	592.84
12	1,734.98	358.64	1,378.76

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs): 346.83

Upstream Demand (cfs): 11.81

Downstream Demand (cfs): 7.67

Pump rate (cfs): 0.00

Headwater Safety (cfs): 0.00

Ungauged Stream Safety (cfs): 0.00

Min. Gauge Reading (cfs): 352.81

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.

09/13/2013

### Source Detail

WMP-01324

API/ID Number: 047-091-01284

Operator: EQT Production Company

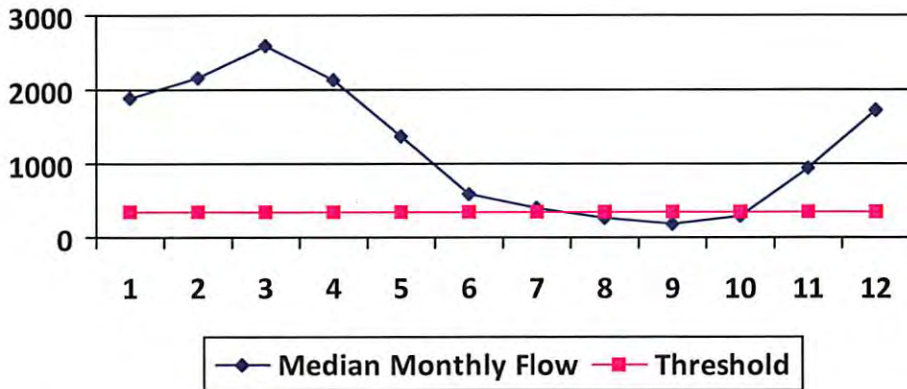
514160 (RSM135H4)

Source ID:	20362	Source Name: Southwestern Water District Southwestern Water District	Source Latitude: - Source Longitude: -
HUC-8 Code:	5020001	Drainage Area (sq. mi.): 929.63	County: Barbour
<input type="checkbox"/> Endangered Species? <input type="checkbox"/> Mussel Stream? <input type="checkbox"/> Trout Stream? <input type="checkbox"/> Tier 3? <input type="checkbox"/> Regulated Stream? <input checked="" type="checkbox"/> Proximate PSD?          Taylor County PSD <input checked="" type="checkbox"/> Gauged Stream?		Anticipated withdrawal start date: 8/1/2013 Anticipated withdrawal end date: 8/1/2014 Total Volume from Source (gal): Max. Pump rate (gpm): 0 Max. Simultaneous Trucks: Max. Truck pump rate (gpm):	

Reference Gaug	3054500	TYGART VALLEY RIVER AT PHILIPPI, WV	Gauge Threshold (cfs): 341
Drainage Area (sq. mi.)	914.00		

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	1,897.38	358.64	1,541.16
2	2,151.34	358.64	1,795.12
3	2,595.90	358.64	2,239.68
4	2,128.11	358.64	1,771.89
5	1,372.82	358.64	1,016.60
6	584.97	358.64	228.75
7	401.23	358.64	45.01
8	280.03	358.64	-76.19
9	177.08	358.64	-179.14
10	286.20	358.64	-70.02
11	949.06	358.64	592.84
12	1,734.98	358.64	1,378.76

### Water Availability Profile



#### Water Availability Assessment of Location

Base Threshold (cfs):	346.83
Upstream Demand (cfs):	11.81
Downstream Demand (cfs):	7.67
Pump rate (cfs):	0.00
Headwater Safety (cfs):	0.00
Ungauged Stream Safety (cfs):	0.00
Min. Gauge Reading (cfs):	352.81
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.

09/13/2013



## Source Detail

WMP- 01324

API/ID Number: 047-091-01284

Operator: EQT Production Company

514160 (RSM135H4)

Source ID: 20360 Source Name Tygart River @ Kuhnes Withdrawal Site A  
Charlie & Peggy Kuhnes

Source Latitude: 39.35692  
Source Longitude: -80.05474

HUC-8 Code: 5020001

Drainage Area (sq. mi.): 1302.2 County: Taylor

Anticipated withdrawal start date: 8/1/2013

Anticipated withdrawal end date: 8/1/2014

Endangered Species?  Mussel Stream?

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

Trout Stream?  Tier 3?

Max. Pump rate (gpm): 1,260

Regulated Stream? Tygart Valley Dam

Max. Simultaneous Trucks: 0

Proximate PSD?

Max. Truck pump rate (gpm) 0

Gauged Stream?

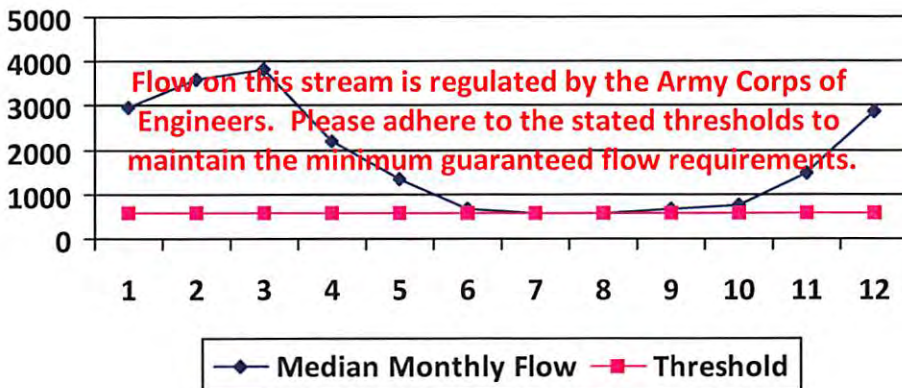
Reference Gaug 3057000 TYGART VALLEY RIVER AT COLFAX, WV

Drainage Area (sq. mi.) 1,363.00

Gauge Threshold (cfs): 624

Month	Median monthly flow (cfs)	Threshold (+ pump)	Estimated Available water (cfs)
1	2,968.50	-	-
2	3,584.04	-	-
3	3,829.89	-	-
4	2,188.80	-	-
5	1,373.55	-	-
6	695.24	-	-
7	584.64	-	-
8	593.45	-	-
9	661.90	-	-
10	755.75	-	-
11	1,477.45	-	-
12	2,905.01	-	-

### Water Availability Profile



### Water Availability Assessment of Location

Base Threshold (cfs):	-
Upstream Demand (cfs):	20.95
Downstream Demand (cfs):	11.59
Pump rate (cfs):	2.81
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.

09/13/2013



## Water Management Plan: Secondary Water Sources



WMP- 01324

API/ID Number | 047-091-01284

Operator:

EQT Production Company

514160 (RSM135H4)

### 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.

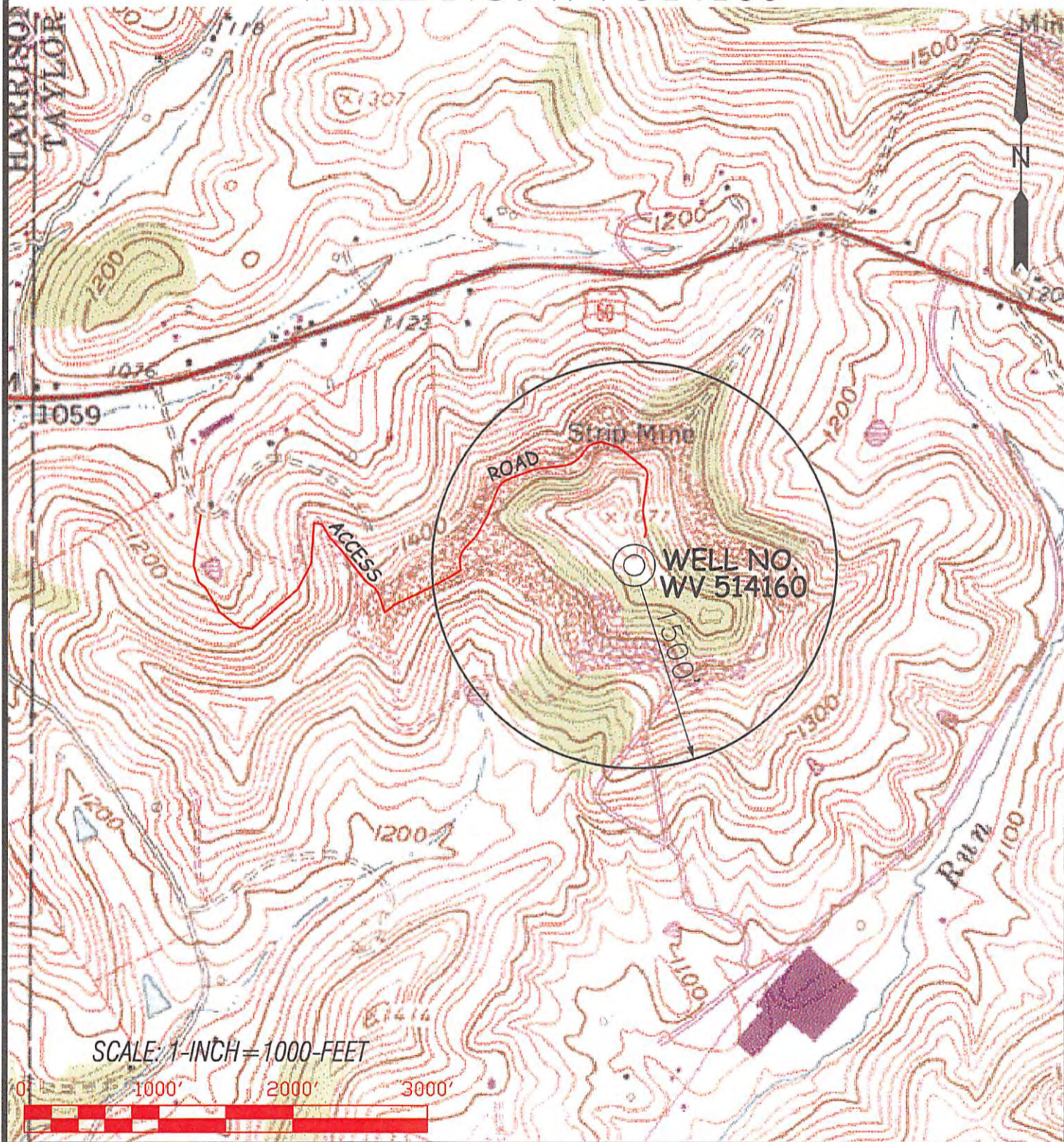
### Recycled Frac Water


Source ID:	20363	Source Name	Various	Source start date:	8/1/2013
				Source end date:	8/1/2014
	Source Lat:		Source Long:		County
	Max. Daily Purchase (gal)		Total Volume from Source (gal):		12,000,000
DEP Comments:					

WATER SAMPLES

page of

# TUCKER LEASE WELL NO. WV 514160



 <p>Professional Energy Consultants A DIVISION OF SMITH LANG CHAPMAN WEG</p> <p>SURVEYORS PROJECT MANAGERS</p> <p>ENGINEERS ENVIRONMENTAL</p> <p>238 Grand Mall Dr. P.O. Box 100 Martinsburg, WV 26101 (304) 263-8834</p> <p>3690 Silver Spring Place Martinsburg, WV 26157 (304) 637-8111</p> <p>INTEGRITY. SECURITY. QUALITY.</p>		<p>TOPO SECTION OF: ROSEMONT, WV 7.5' QUAD.</p>			<p>OPERATOR: EQT PRODUCTION COMPANY 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330</p>	
DRAWN BY K.D.W.	FILE NO. 7668	DATE 04/19/13	CADD FILE: 7668WS514160R3	DISTRICT FLEMINGTON	COUNTY TAYLOR	TAX MAP-PARCEL NO. 01-07

09/13/2013  
Office of Oil & Gas

MAY 31 2013

1. TIES TO WELLS, CORNERS AND REFERENCES 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 197 PAGE 690, DEED BOOK 294 PAGE 342, DEED BOOK 296 PAGE 130, DEED BOOK 161 PAGE 548, DEED BOOK 149 PAGE 155 & A WELL PLAT FOR A.P.I. #47-091-0044.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF TAYLOR COUNTY IN JULY, 2013.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS (SURVEY GRADE).
5. SLS RECOMMENDS ANY NECESSARY JV'S BE ACQUIRED BEFORE DRILLING COMMENCES.
6. PLAT DATED 2/20/12 REVISED 4/19/12 TO REFLECT NEW BOTTOM HOLE COORDINATES & 06/24/13 TO SHOW UPDATES & 08/20/13 TO ADD LEASE INFORMATION, ETC.

LONGITUDE 80° 10' 00"

13,980'

WELL NO. WV 514160  
STATE PLANE COORDINATES  
NORTH ZONE (NAD'27)  
N. 290,272.0  
E. 1,805,610.5

LAT=(N) 39.294928  
LONG=(W) 80.196851

UTM (NAD'83)(METERS)  
N. 4,349,831.2  
E. 570,135.8

GREENWOOD  
LAND INC.  
141.86 ACRES±  
TM 1-07

HIGHLAND RIDGE  
SUBDIVISION  
LEASE  
#123604

WELL NO.  
WV 514160

JAMES M. TAYLOR  
ET AL  
140.48 ACRES±

LEASE #  
122267

1.10 AC±  
TM 1-7.69

JAMES & TAMMY JONES  
31.15 AC±  
TM 6-4.1

LANDING POINT  
WELL NO. WV 514160  
STATE PLANE COORDINATES  
NORTH ZONE (NAD'27)  
N. 290,536.0  
E. 1,806,939.8

LAT=(N) 39.295681  
LONG=(W) 80.182161

UTM (NAD'83)(METERS)  
N. 4,349,918.4  
E. 570,539.5

LEASE #  
122266

JAMES J. CAVA, JR.  
ET UX  
109.97 AC±  
TM 6-4.2

LEASE #  
123605

BOTTOM HOLE  
WELL NO. WV 514160  
STATE PLANE COORDINATES  
NORTH ZONE (NAD'27)  
N. 284,191.9  
E. 1,809,898.2

LAT=(N) 39.278324  
LONG=(W) 80.171541

UTM (NAD'83)(METERS)  
N. 4,348,000.6  
E. 571,472.9

P/O  
LEASE #  
122267

JAMES J. CAVA, JR.  
ET UX  
147.07 ACRES±

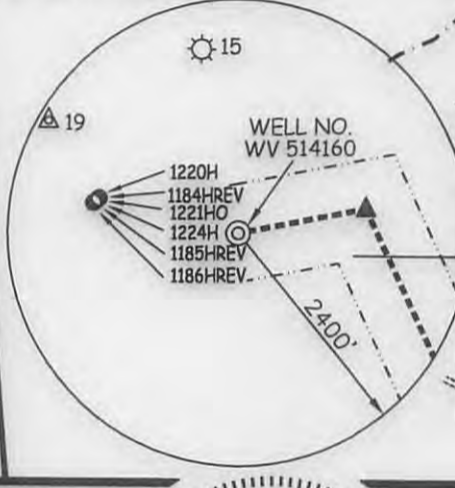
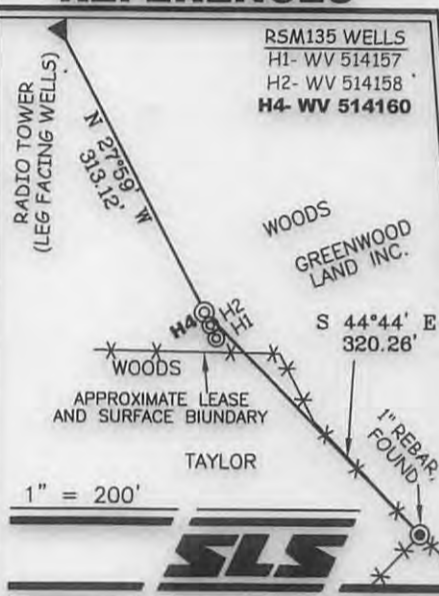
DAVE KELLEY  
105.10 ACRES±  
TM 6-42

**EQT PRODUCTION CO.  
TUCKER LEASE  
396 ACRES±  
WELL NO. WV 514160**

**REFERENCES**

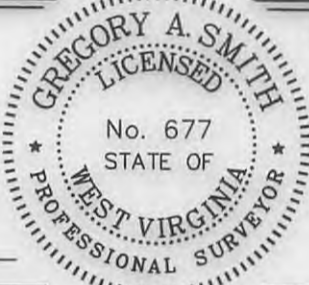
RSM135 WELLS  
H1- WV 514157  
H2- WV 514158  
H4- WV 514160

A- JOSEPH G. PASTORIAL ET AL (1.50 AC±) TM 1-7.53  
B- GARY W. & SHERRY A. TAYLOR (3.00 AC±) TM 1-7.54  
C- RICHARD A. HEIM (1.68 AC±) TM 1-7.55



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 20, 20 13  
OPERATORS WELL NO. WV 514160  
API WELL NO. 47 - 91 - 01284 HGA  
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 7668P514160R7 (390-02)  
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 1000'

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 1,632' (GROUND) / 1,615' (PROPOSED) WATERSHED TRIBUTARY OF PEDDLER RUN  
DISTRICT FLEMINGTON COUNTY TAYLOR QUADRANGLE ROSEMONT 7.5'

SURFACE OWNER GREENWOOD LAND INC. ACREAGE 141.86 ±

ROYALTY OWNER GREENWOOD LAND INC. ET AL (396 AC±) / PENNY A. KNOTTS ET AL (756 AC±) / JOHN SCHNAUTZ HRS

PROPOSED WORK: LEASE NO. 123604 / 123605 / 386001  
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