west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

July 08, 2013

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-1706252, 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: 514320
Farm Name: JORDAN FAMILY PARTNERSHIP
API Well Number: 47-1706252
Permit Type: Horizontal 6A Well
Date Issued: 07/08/2013

Promoting a healthy environment.

5

PERMIT CONDITIONS

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

CONDITIONS

1. 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.

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STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
W.VA. CODE §22-6A - WELL WORK PERMIT APPLICATION

Well Operator:	EQT Production Company		017	3	286
		Operator ID	County	District	Quadrangle

Operator's Well Number: 514320 Well Pad Name CPT11

Elevation, current ground: 1,130.0 Elevation, proposed post-construction: 1,111.0

Well Type: (a) Gas ▪ Oil

Other

(b) If Gas: Shallow ▪ Deep

Horizontal ▪

Existing Pad? Yes or No: No

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

Target formation is Marcellus at a depth of 6979' with the anticipated thickness to be 46' feet and anticipated target pressure of 4691 PSI

Proposed Total Vertical Depth: 7,101 ✓

Formation at Total Vertical Depth: Onondaga

Proposed Total Measured Depth: 12,586

)) Approximate Fresh Water Strata Depths: 66,337,386, 406, 616, 704

) Method to Determine Fresh Water Depth: By offset wells

:) Approximate Saltwater Depths: 1661 & 1389

3) Approximate Coal Seam Depths: 852 & 1264

4) Approximate Depth to Possible Void (coal mine, karst, other): None Reported

5) Does land contain coal seams tributary or adjacent to, active mine? None Reported

6) Describe proposed well work: Drill and complete a new horizontal well. The vertical drill to go down to approximately depth of 7101' Tagging the Onondaga not more than 100' then plug back to approximately 5237' and kick off the horizontal leg into the marcellus using a slick water frac.

7) Describe fracturing/stimulating methods in detail:

/draulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from shwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid, elling agent, gel breaker, friction reducer, biocide, and scale inhibitor). Stage lengths vary from 150 to 450 feet. Average approximately)0,000 gallons of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 400,000 pounds of sand per stage.

8) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 43.82

9) Area to be disturbed for well pad only, less access road (acres): 15.68

David McCuskey

Douglas Newlon

4-19-2013

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CASING AND TUBING PROGRAM

20)

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	804	804	705 CTS
Coal	-	New	-	-	-	-	-
Intermediate	9 5/8	New	MC-50	40	5,242	5,242	2066 CTS
Production	5 1/2	New	P-110	20	12,586	12,586	See Note 1
Tubing	2 3/8		J-55	4.6			will be set 100' less than TD
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20	24	0.635	-	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.

GG 7/8/13

17-06252

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.

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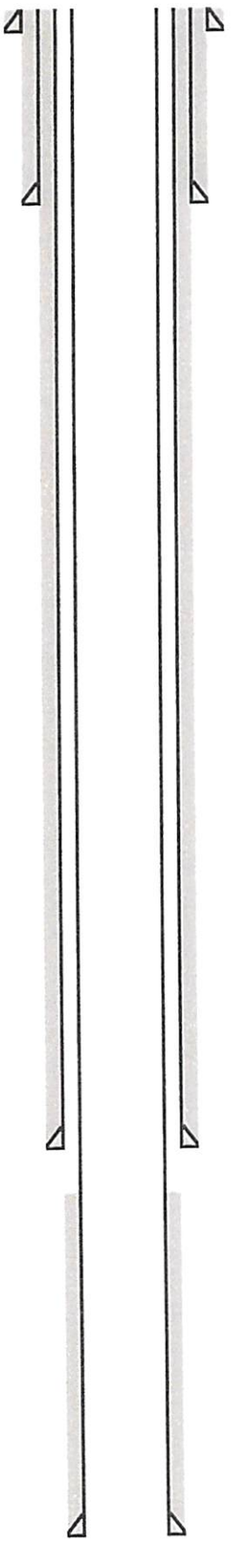
Well Schematic
EQT Production

Well Name	514320 (CPT11H5)
County	Doddridge
State	West Virgina

Elevation KB:	1121
Target	Marcellus
Prospect	
Azimuth	140.85
Vertical Section	5625



0'
500'
704' Fresh Water Base
1,000' 1,097' Base Red Rock
1,500'
2,000' 1,960' Maxton
2,120' Big Lime
2,216' Big Injun
2,500' 2,487' Weir
2,619' -Gantz
2,686' -Fifty foot
2,825' -Thirty foot
2,912' -Gordon
3,000' 2,976' -Forth Sand
3,074' -Fifth Sand
3,500' 3,550' -Warren
3,757' -Speechley
4,000' 3,987' -Balltown A
4,500' 4,420' -Bradford
5,000'
5,125' -Benson
5,242' Int. csg pt
5,500' 5,545' -Alexander
6,000'
6,500' 6,583' -Sonyea
6,725' -Middlesex
6,761' -Genesee
6,843' -Geneseo
6,871' -Tully
6,895' -Hamilton
7,000' 6,955' -Marcellus
7,001' Onondaga
7,500'

Hole Size 24" - 20" Conductor at 40'
Bit Size 17.5"

TOC @ Surface
13 3/8", MC-50, 54.5# @ 804' ft MD
Bit Size 12.375"

TOC @ Surface
9 5/8", MC-50, 40# @ 5,242' ft MD
Bit Size 8.5"

KOP = 5,237' ft MD
10 Deg DLS

Land @ 7,746' ft MD
6,979' ft TVD

5 1/2", P-110, 20# 12,086' ft MD
6,979' ft TVD

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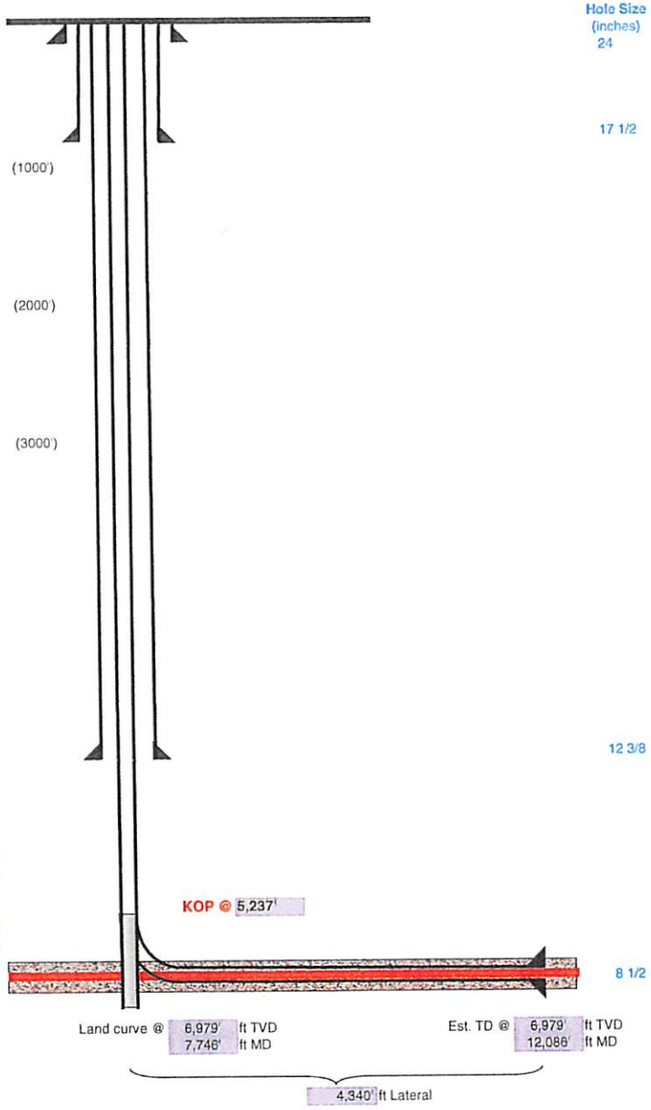
Well 514320 (CPT11H5)
EQT Production
Center Point
Doddridge West Virgina

Azimuth 140.85
Vertical Section 5625



TVD Depth (feet)	Formation Tops (TVD)		Hole Size (inches)	Casing Type	Size (inches)	Wt (ppf)/Grade
0'			24	Conductor	20	
250'						
500'						
750'	Base Fresh Water	704	17 1/2	Surface	13 3/8	54#/MC-50
1,000'						
1,250'	Base Red Rock	1097				
1,500'						
1,750'						
2,000'	Maxton	1960 - 2032				
	Big Lime	2120 - 2216				
2,250'	Big Injun	2216 - 2383				
	Weir	2487 - 2552				
2,500'	-Gantz	2619 - 2674				
	-Fifty foot	2686 - 2734				
	-Thirty foot	2825 - 2850				
2,750'	-Gordon	2912 - 2976				
	-Forth Sand	2975 - 3074				
3,000'	-Fifth Sand	3074 - 3151				
3,250'						
3,500'	-Warren	3550 - 3606				
3,750'	-Speechley	3757 - 3956				
	-Balltown A	3987 - 4110				
4,000'						
4,250'						
	-Bradford	4420 - 4542				
4,500'						
4,750'						
5,000'						
	-Benson	5123 - 5192				
5,250'	Int. csg pt	5242	12 3/8	Intermediate	9 5/8	40#/MC-50
5,500'	-Alexander	5545 - 5669				
5,750'						
6,000'	-Sonyea	6583 - 6677				
	-Middlesex	6725 - 6791				
6,250'	-Genesee	6791 - 6843				
	-Geneseo	6843 - 6871				
6,500'	-Tully	6871 - 6895				
	-Hamilton	6895 - 6955				
6,750'	Marcellus top	6955	8 1/2	Production Casing	5 1/2	20#/P-110
	Target Inside Marcellus	6979				
7,000'	Marcellus Bottom	7001				

TD Pilot Hole @ 7101
100' below top of Onondaga
Run Logs, Plug back to KOP at 5237
Kick off for horizontal well in Marcellus

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WW-9
Rev. 1/12

API No. 47 - 017 - 0 6252
Operator's Well No. 514320

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 CPT11 OP Code

Watershed Flint Run of McElroy Creek Quadrangle Center Point 7.5'

Elevation 1111.0 County Doddridge District Grant

Description of anticipated Pit Waste: N/A

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

Will a synthetic liner be used in the pit? N/A If so, what mil.? N/A

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)

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? MILBAR, Viscosifer, Alkalinity Control, Lime, Chloride Salts, Filtration Control, Deflocculant, Lubricant, Detergent, Defoaming, Walnut Shell, X-Cide, SOLTEX Terra Rate

Will closed loop system be used ? YES

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

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Subscribed and sworn before me this 28 day of March, 20 13

Notary Public

My commission expires 6/21/2018

17-06252

EQT Production Water plan
Offsite disposals for Marcellus wells

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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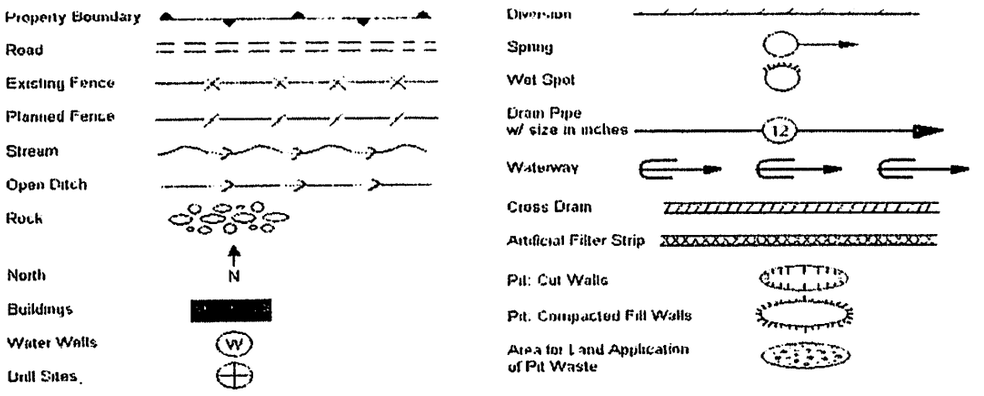
API No. 47 - 017 - 0
Operator's Well No. 514320



Proposed Revegetation Treatment: Acres Disturbed 43.82 Prevegetation pH 7.6

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 Newlon

Comments: Preseed & Mulch install E&S To Dep regulations

Title: Oil & Gas inspector Date: 4-19-2013

Field Reviewed? (✓) Yes ( ) No

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Water Management Plan:
Primary Water Sources

WMP-01244	API/ID Number:	047-017-06252	Operator:	EQT Production Company
		514320 (CPT11H5)		

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 mutiple wells and well sites. In these cases, the thresholds set by the Water Management Plan are to be interepreted as total withdrawal limits for each location over the specified date range regardless of how many wells are supported by that intake.

For all purchased water intakes, determinations of water availability are made at the original source intake location. It is the responsibility of the Oil and Gas Operator, not the seller, to cease withdrawal of water from the seller when flows are less than the minimum gauge reading at the stream gauge referenced by the Water Management Plan in order to protect stream uses.

Note that the determinations made herein are based on the best available data, but it is impossible to predict water availability in the future. While the DEP has carefully established these minimum withdrawal thresholds, it remains the operator's responsibility to protect aquatic life at all times. Approval to withdrawal is contingent upon permission from the land owner. It is the responsibility of the operator to secure and maintain permission prior to any withdrawals.

The operator is reminded that 24-48 hours prior to withdrawing (or purchasing) water, DEP must be notified by email at DEP.water.use@wv.gov.

APPROVED JUN 1 1 2013

Source Summary

WMP-01244 API Number: 047-017-06252 Operator: EQT Production Company

514320 (CPT11H5)

Stream/River

- Source **Ohio River at Hannibal, OH** Owner: **Richard Potts/Rich Merryman**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
6/1/2013	6/1/2014	7,100,000		39.655883	-80.86678

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

Max. Pump rate (gpm): 1,500 **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 @ Westbrook Trucking Site** Owner: **Stephen R. and Janet Sue Westbrook**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
6/1/2013	6/1/2014	7,100,000		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** Owner: **Select Energy**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
6/1/2013	6/1/2014	7,100,000		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** Owner: **Michael J. Travis**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
6/1/2013	6/1/2014	7,100,000		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** Owner: **William Whitehill**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
6/1/2013	6/1/2014	7,100,000		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 **McElroy Creek @ Wine Withdrawal Site** Owner: **Elton Wine**

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
6/1/2013	6/1/2014	7,100,000		39.39402	-80.70576

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

Max. Pump rate (gpm): 1,260 **Min. Gauge Reading (cfs): 72.54** **Min. Passby (cfs) 10.66**

DEP Comments:

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

Start Date	End Date	Total Volume (gal)	Max. daily purchase (gal)	Intake Latitude:	Intake Longitude:
6/1/2013	6/1/2014	7,100,000		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 Detail

WMP-01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

Source ID: 18118 | Source Name: Ohio River at Hannibal, OH
Richard Potts/Rich Merryman

Source Latitude: 39.655883
Source Longitude: -80.86678

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 25000 | County: Wetzel

Anticipated withdrawal start date: 6/1/2013
Anticipated withdrawal end date: 6/1/2014

Total Volume from Source (gal): 7,100,000

Max. Pump rate (gpm): 1,500

Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

- [ ] Endangered Species?
- [ ] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? Ohio River Min. Flow
- [x] Proximate PSD? New Martinsville
- [x] Gauged Stream?

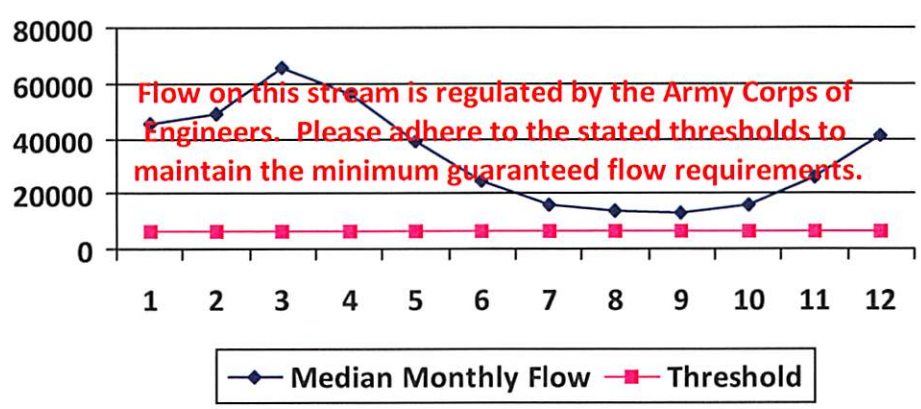
Reference Gaug: 9999999 | Ohio River Station: Willow Island Lock & Dam

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):	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

WMP-01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

Source ID: 18119 | Source Name: Ohio River @ Westbrook Trucking Site
Stephen R. and Janet Sue Westbrook

Source Latitude: 39.384455
Source Longitude: -81.25645

HUC-8 Code: 5030201

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

Anticipated withdrawal start date: 6/1/2013
Anticipated withdrawal end date: 6/1/2014
Total Volume from Source (gal): 7,100,000
Max. Pump rate (gpm): 1,260
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

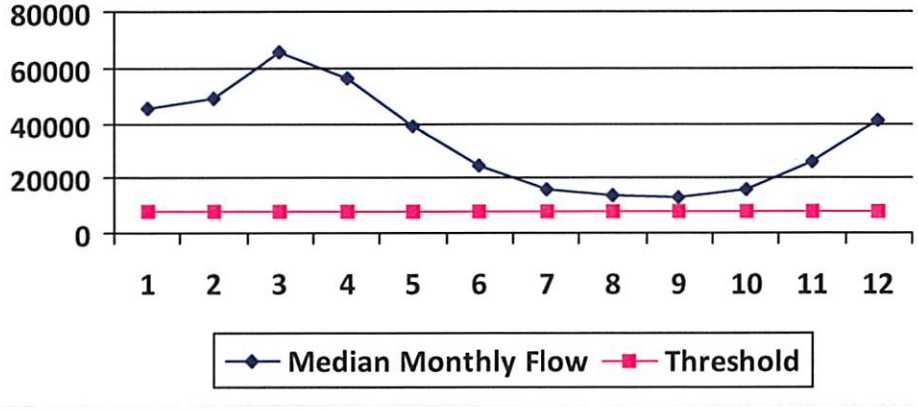
- ☐ Endangered Species?
- ☑ Mussel Stream?
- ☐ Trout Stream?
- ☐ Tier 3?
- ☐ Regulated Stream?
- Ohio River Min. Flow
- ☐ Proximate PSD?
- ☐ Gauged Stream?

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

WMP-01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

Source ID: 18120 | 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: 6/1/2013

Anticipated withdrawal end date: 6/1/2014

Total Volume from Source (gal): 7,100,000

Max. Pump rate (gpm): 1,500

Max. Simultaneous Trucks: 0

Max. Truck pump rate (gpm) 0

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

Ohio River Min. Flow

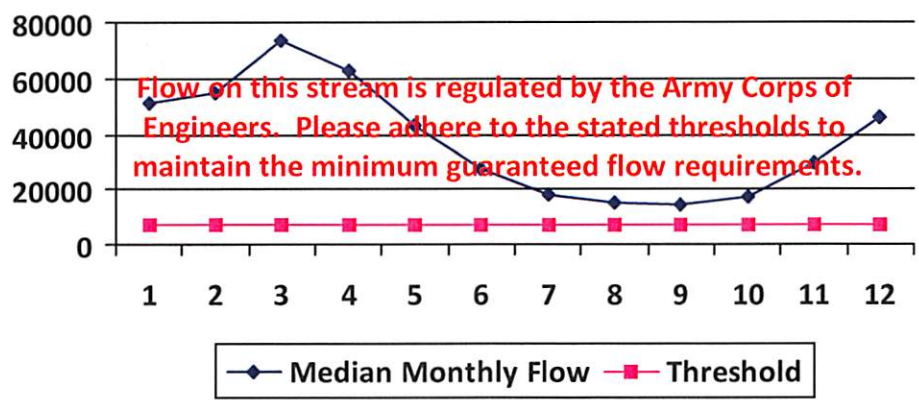
Reference Gaug: 9999998 | Ohio River Station: Racine Dam

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

WMP-01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

Source ID: 18121 | 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: 6/1/2013
Anticipated withdrawal end date: 6/1/2014
Total Volume from Source (gal): 7,100,000
Max. Pump rate (gpm): 4,200
Max. Simultaneous Trucks: 10
Max. Truck pump rate (gpm) 420

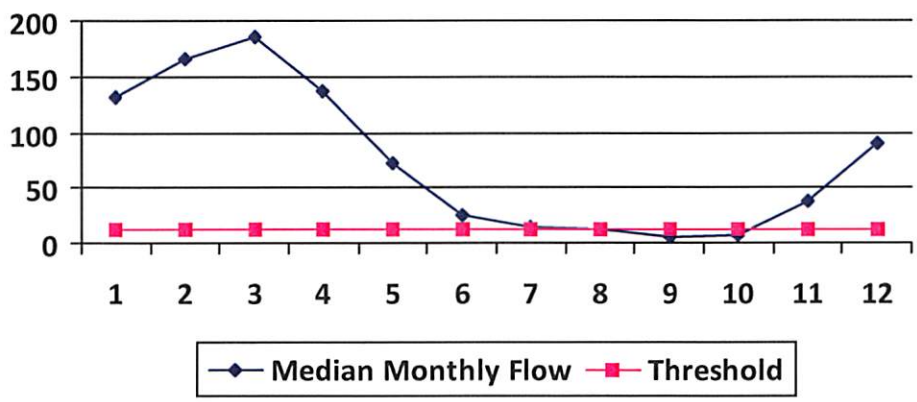
- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [x] Proximate PSD? West Union Municipal Water
- [x] Gauged Stream?

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

WMP-01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

Source ID: 18122 | Source Name: Middle Island Creek @ Rock Run
William Whitehill

Source Latitude: 39.298763
Source Longitude: -80.760682

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 107.35 | County: Doddridge

Anticipated withdrawal start date: 6/1/2013
Anticipated withdrawal end date: 6/1/2014
Total Volume from Source (gal): 7,100,000
Max. Pump rate (gpm): 1,680
Max. Simultaneous Trucks: 4
Max. Truck pump rate (gpm) 420

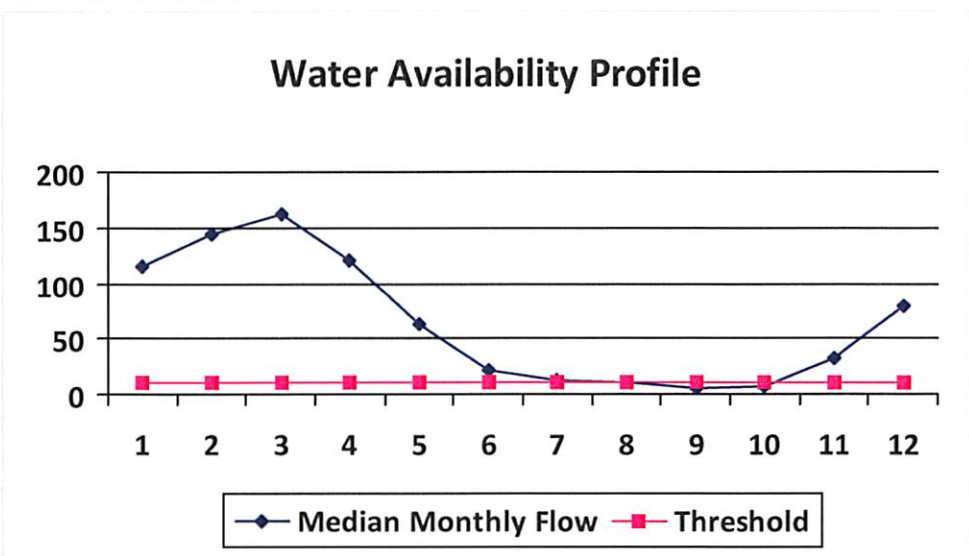
- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [x] Proximate PSD? West Union Municipal Water
- [x] Gauged Stream?

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	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 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

WMP-01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

Source ID: 18123 | Source Name: McElroy Creek @ Wine Withdrawal Site
Elton Wine

Source Latitude: 39.39402
Source Longitude: -80.70576

HUC-8 Code: 5030201

Drainage Area (sq. mi.): 57.19 | County: Doddridge

Anticipated withdrawal start date: 6/1/2013
Anticipated withdrawal end date: 6/1/2014
Total Volume from Source (gal): 7,100,000
Max. Pump rate (gpm): 1,260
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

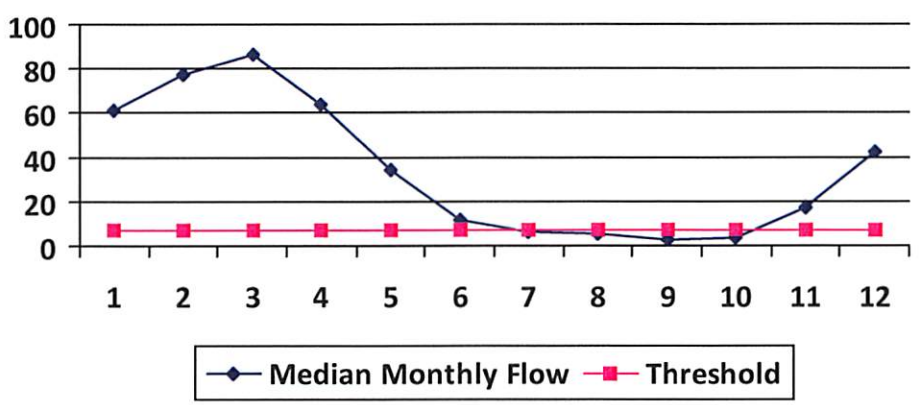
- [x] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [ ] Regulated Stream?
- [ ] Proximate PSD?
- [ ] Gauged Stream?

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	61.33	13.47	48.08
2	77.15	13.47	63.90
3	86.32	13.47	73.08
4	64.10	13.47	50.86
5	33.82	13.47	20.57
6	11.81	13.47	-1.44
7	6.68	13.47	-6.56
8	5.50	13.47	-7.74
9	2.82	13.47	-10.43
10	3.54	13.47	-9.71
11	17.29	13.47	4.04
12	42.25	13.47	29.00

Water Availability Profile



Water Availability Assessment of Location

Base Threshold (cfs):	5.62
Upstream Demand (cfs):	2.23
Downstream Demand (cfs):	2.23
Pump rate (cfs):	2.81
Headwater Safety (cfs):	1.40
Ungauged Stream Safety (cfs):	1.40
Min. Gauge Reading (cfs):	**72.54**
Passby at Location (cfs):	**10.66**

"Threshold", as depicted in the chart above is meant only to indicate the calculated base threshold at the proposed withdrawal location. This value does not include the proposed pump rate or existing demand on the stream. Refer to the monthly breakdown above for a more complete estimation of water availability by month.

Source Detail

WMP-01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

Source ID: 18124 | 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: 6/1/2013
Anticipated withdrawal end date: 6/1/2014
Total Volume from Source (gal): 7,100,000
Max. Pump rate (gpm): 1,260
Max. Simultaneous Trucks: 0
Max. Truck pump rate (gpm) 0

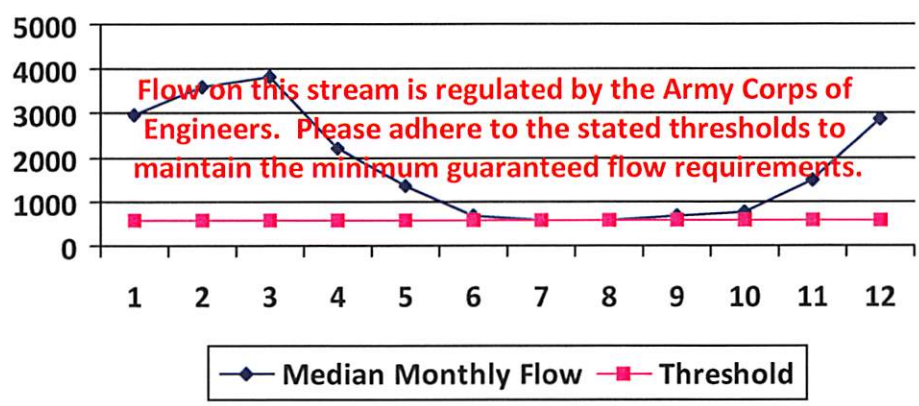
- [ ] Endangered Species?
- [x] Mussel Stream?
- [ ] Trout Stream?
- [ ] Tier 3?
- [x] Regulated Stream? — Tygart Valley Dam
- [ ] Proximate PSD?
- [x] Gauged Stream?

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.

Water Management Plan:
Secondary Water Sources

WMP- 01244 | API/ID Number: 047-017-06252 | Operator: EQT Production Company

514320 (CPT11H5)

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: 18125 | Source Name: Maxson Property Test Well #1 | Source start date: 6/1/2013 | Source end date: 6/1/2014

Source Lat: 39.14472 | Source Long: -80.84664 | County: Doddridge

Max. Daily Purchase (gal): | Total Volume from Source (gal): 7,100,000

DEP Comments:

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/Reservior

Source ID: 18126 Source Name: Pennsboro Lake
Source start date: 6/1/2013
Source end date: 6/1/2014
Source Lat: 39.281689 Source Long: -80.925526 County: Ritchie
Max. Daily Purchase (gal): Total Volume from Source (gal): 7,100,000
DEP Comments:

Recycled Frac Water

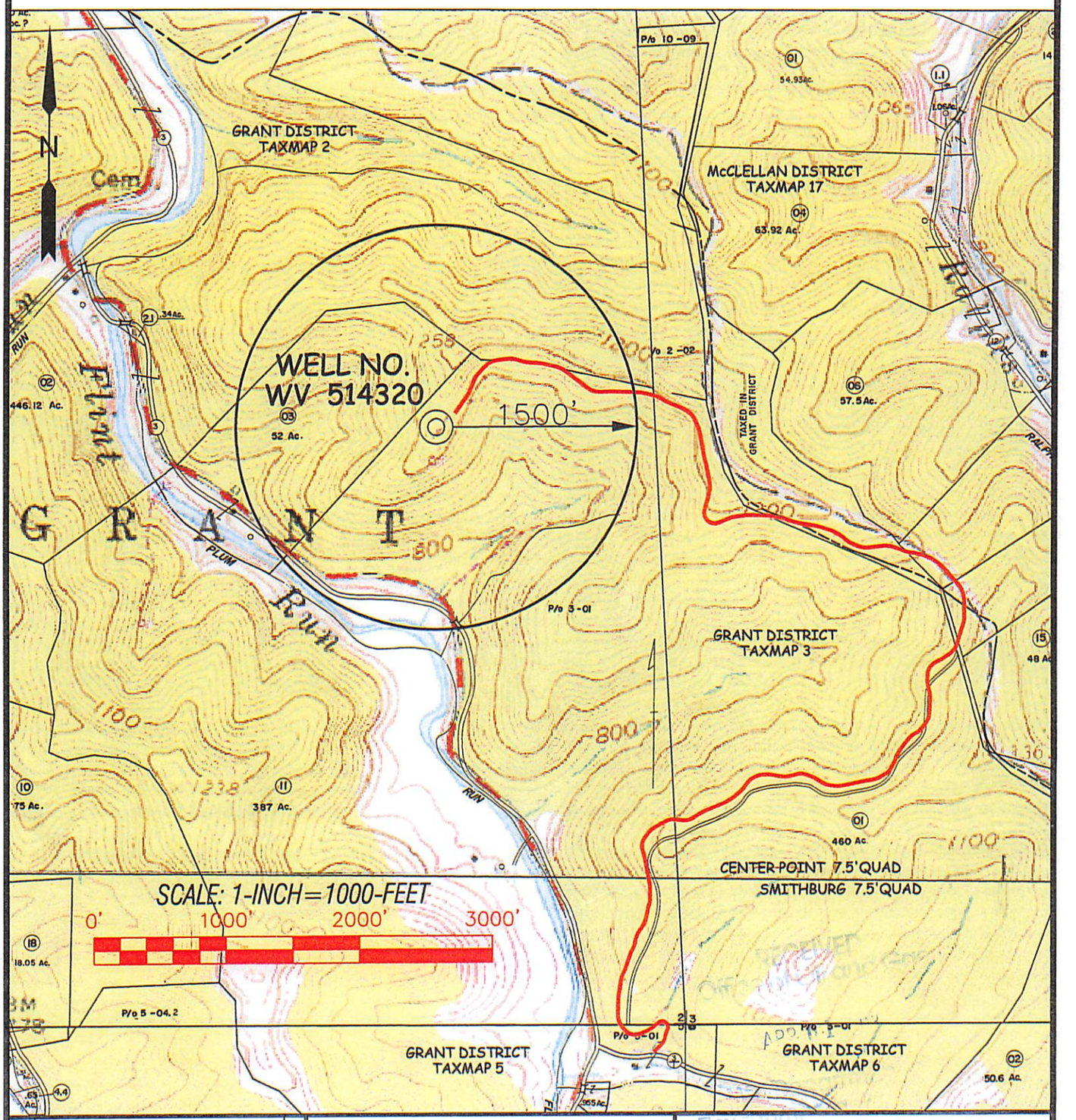
Source ID: 18127 Source Name: Various
Source start date: 6/1/2013
Source end date: 6/1/2014
Source Lat: Source Long: County:
Max. Daily Purchase (gal): Total Volume from Source (gal): 7,100,000
DEP Comments:

17-6252

WATER SAMPLES

page of

J.D. McREYNOLDS LEASE
WELL NO. WV 514320



Professional Energy Consultants
A DIVISION OF SMITHLAND SURVEYING
SURVEYORS PROJECT MGMT. SLS ENGINEERS ENVIRONMENTAL
HONESTY. INTEGRITY. QUALITY

DRAWN BY	FILE NO.	DATE	CADD FILE:
K.D.W.	7749	03/13/13	7746WS514320.dwg

TOPO SECTION OF:
CENTER POINT, WV 7.5' QUAD.

COUNTY	DISTRICT	TAX MAP-PARCEL NO.
DODDRIDGE	GRANT	3 - 01

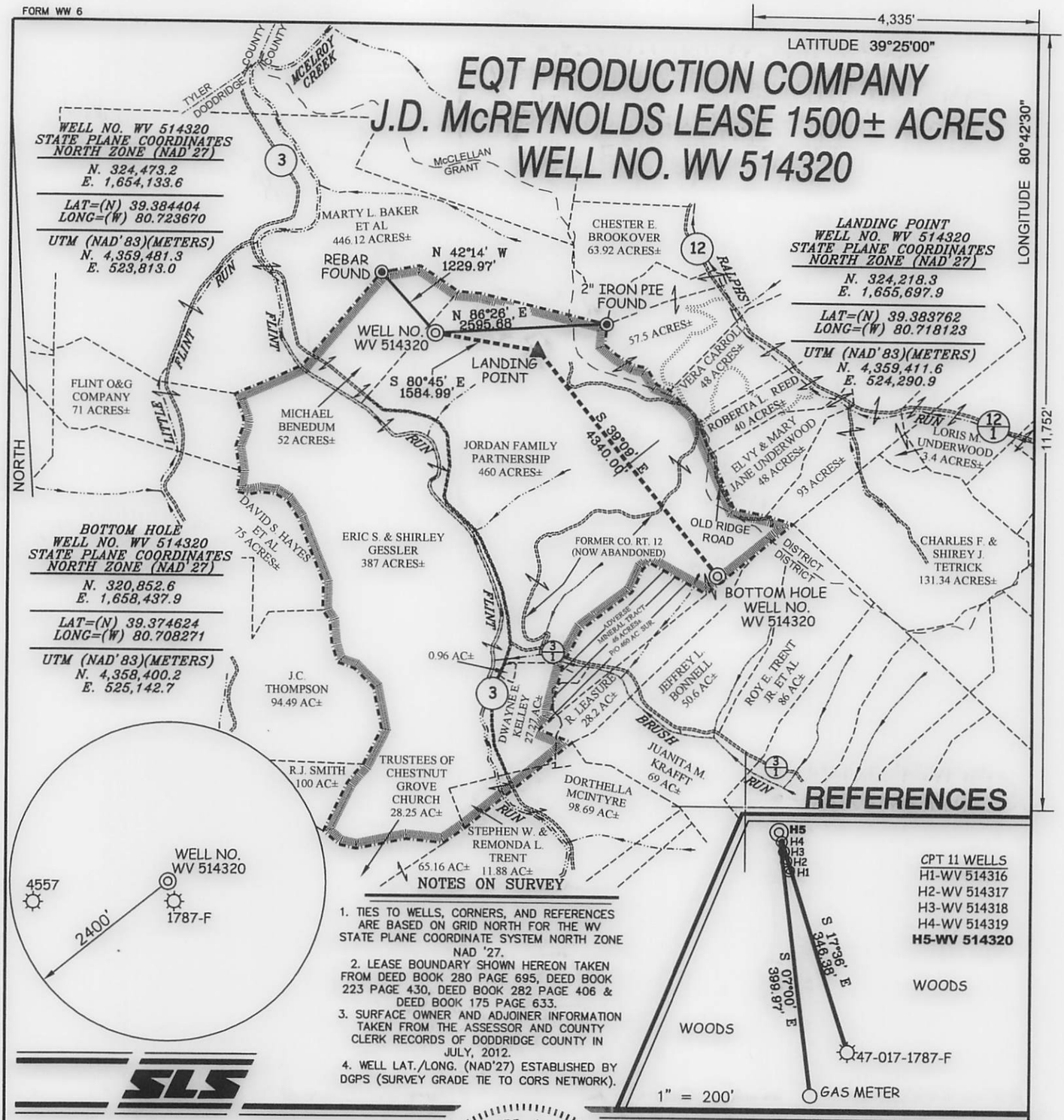
OPERATOR:
EQT PRODUCTION COMPANY
115 PROFESSIONAL PLACE
P.O. BOX 280
BRIDGEPORT, WV 26330

17-06252 H6A 514320
ANTERO RESOURCES

PAD NAME: CPT 11

FORM WW 6

EQT PRODUCTION COMPANY
J.D. McREYNOLDS LEASE 1500± ACRES
WELL NO. WV 514320



NOTES ON SURVEY

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 280 PAGE 695, DEED BOOK 223 PAGE 430, DEED BOOK 282 PAGE 406 & DEED BOOK 175 PAGE 633.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF DODDRIDGE COUNTY IN JULY, 2012.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK).

REFERENCES

SLS

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

GREGORY A. SMITH LICENSED No. 677 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

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

DATE MARCH 15, 20 13

OPERATORS WELL NO. WV 514320

API WELL NO. 47 — 17 — 6252 H6A
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200

PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE TIE TO CORS NETWORK)

FILE NO. 7749P514320

SCALE 1" = 2000'

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

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

LOCATION :

ELEVATION 1,130' (GROUND) 1,111 (PROPOSED) WATERSHED FLINT RUN OF McELROY CREEK

DISTRICT GRANT COUNTY DODDRIDGE QUADRANGLE CENTER POINT 7.5'

SURFACE OWNER JORDAN FAMILY PARTNERSHIP ACREAGE 460±

ROYALTY OWNER J.D. McREYNOLDS HEIRS/ASSIGNS ACREAGE 1500±

PROPOSED WORK : LEASE NO. 090500

DRILL X CONVERT ____ DRILL DEEPER ____ REDRILL ____ FRACTURE OR STIMULATE X 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
ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280
BRIDGEPORT, WV 26330

DESIGNATED AGENT REX C. RAY
ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280
BRIDGEPORT, WV 26330

COUNTY NAME

PERMIT

SLS
124588