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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

August 21, 2014

**WELL WORK PERMIT**

**Horizontal 6A Well**

This permit, API Well Number: 47-1706493, 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: 514107  
Farm Name: DAVIES, TOM ET AL  
**API Well Number: 47-1706493**  
**Permit Type: Horizontal 6A Well**  
Date Issued: 08/21/2014

## PERMIT CONDITIONS

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

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### CONDITIONS

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1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE 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.
9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

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  
Operator ID 017 County 8 District 671 Quadrangle

2) Operator's Well Number: 514107 Well Pad Name WEU3

3) Farm Name/Surface Owner: Davies, et al Public Road Access: 50/41

4) Elevation, current ground: 1,228.0 Elevation, proposed post-construction: 1,200.0

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

(b) If Gas: Shallow  Deep   
Horizontal

6) Existing Pad? Yes or No: no

7) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):  
Target formation is Marcellus at a depth of 6748' with the anticipated thickness to be 54 feet and anticipated target pressure of 4543 PSI

8) Proposed Total Vertical Depth: 6,748

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 9,869

11) Proposed Horizontal Leg Length: 1,605

12) Approximate Fresh Water Strata Depths: 309, 349, 375, 407, & 450

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

14) Approximate Saltwater Depths: 960

15) Approximate Coal Seam Depths: 30, 111, 294, 439, & 509

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

17) Does proposed well location contain coal seams directly overlying or adjacent to an active mine?  
(a) If Yes, provide Mine Info: Name: \_\_\_\_\_  
Depth: \_\_\_\_\_  
Seam: \_\_\_\_\_  
Owner: \_\_\_\_\_

*DCW  
8-5-2014*

**CASING AND TUBING PROGRAM**

4701706493

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 C.T.S.
Fresh Water	13 3/8	New	MC-50	54	895	895	781 C.T.S.
Coal	-	-	-	-	-	-	-
Intermediate	9 5/8	New	MC-50	40	5,364	5,364	2,111 C.T.S.
Production	5 1/2	New	P-110	20	9,869	9,869	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							

*PCW  
8-5-2014*

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	* See Note 2	1.21
Coal	-	-	-	-	-	-
Intermediate	9 5/8	12 3/8	0.395	3,590	* See Note 2	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.  
**Note 2:** Reference Variance 2014-17.

08/22/2014

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill and complete a new horizontal well in the Marcellus formation. The vertical drill to go down to an approximate depth of 5875'.  
Then kick off the horizontal leg into the marcellus formation using a slick water frac.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

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), referred to in the industry as a "slickwater" completion. Maximum anticipated treating pressures are expected to average approximately 8500 psi, maximum anticipated treating rates are expected to average approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 200,000 barrels of water per stage. Sand sizes vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per stage.

21) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): ± 15.5 AC

22) Area to be disturbed for well pad only, less access road (acres): ± 2.5 AC

23) 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

24) 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.

25) 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.



4701706493

August 12, 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 WEU3 (47-017-06493)

Dear Mr. Smith,

EQT is requesting the 13 3/8" surface casing to be set at 895'KB, 50' below the red rock base at 845' without setting deeper than 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.

In reviewing the WEU3, 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 895' KB (50' below the red rock show).

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

Sincerely,

Vicki Roark  
Permitting Supervisor-WV

Enc.

Received

AUG 12 2014

08/22/2014

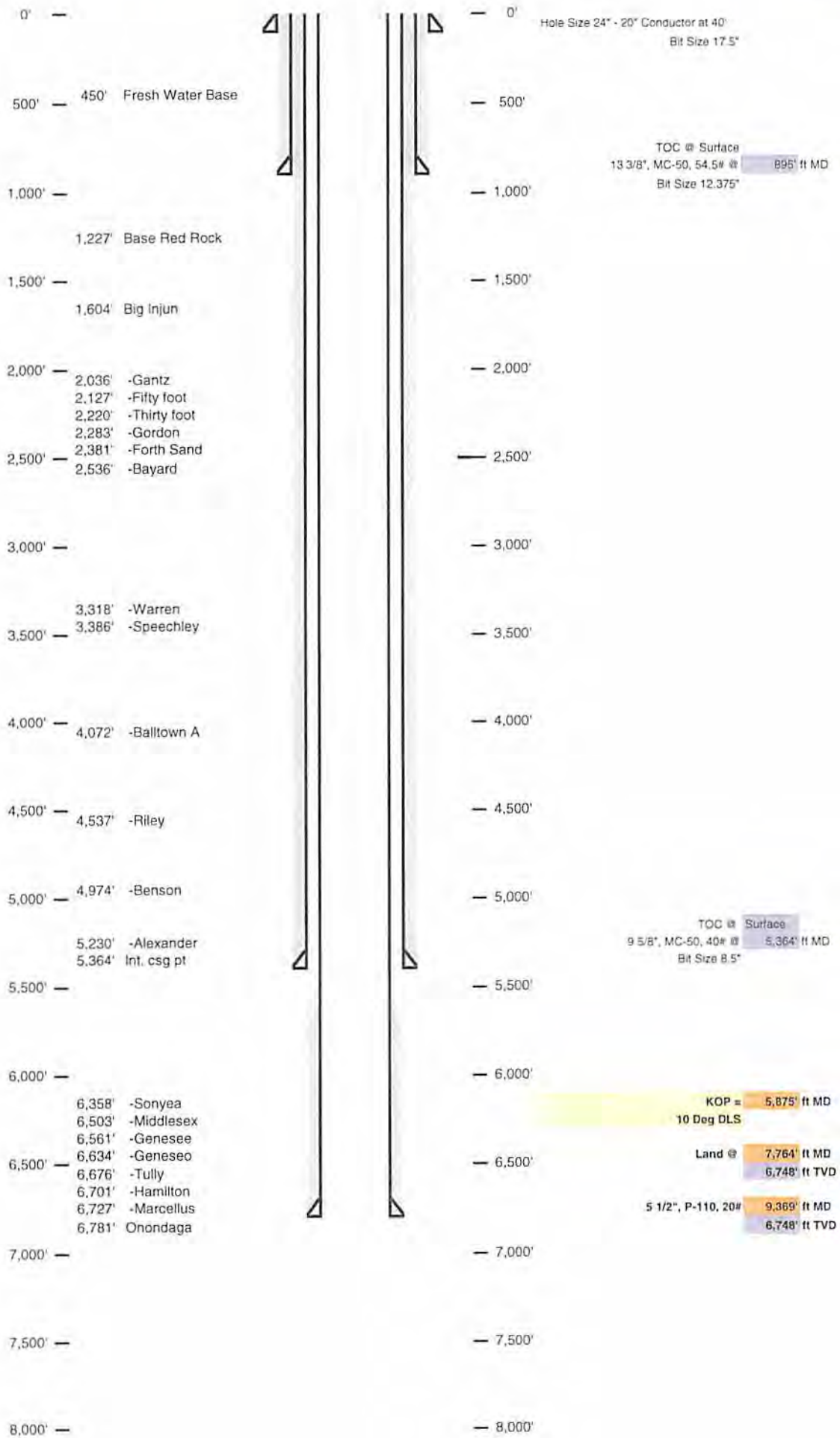
Office of Oil and Gas  
WV Dept. of Environmental Protection

Well Schematic  
EQT Production

4701706493

Well Name 514107 (WEU3H5)  
County Doddridge  
State West Virginia

Elevation KB: 1213  
Target Marcellus  
Prospect  
Azimuth 165  
Vertical Section 2948

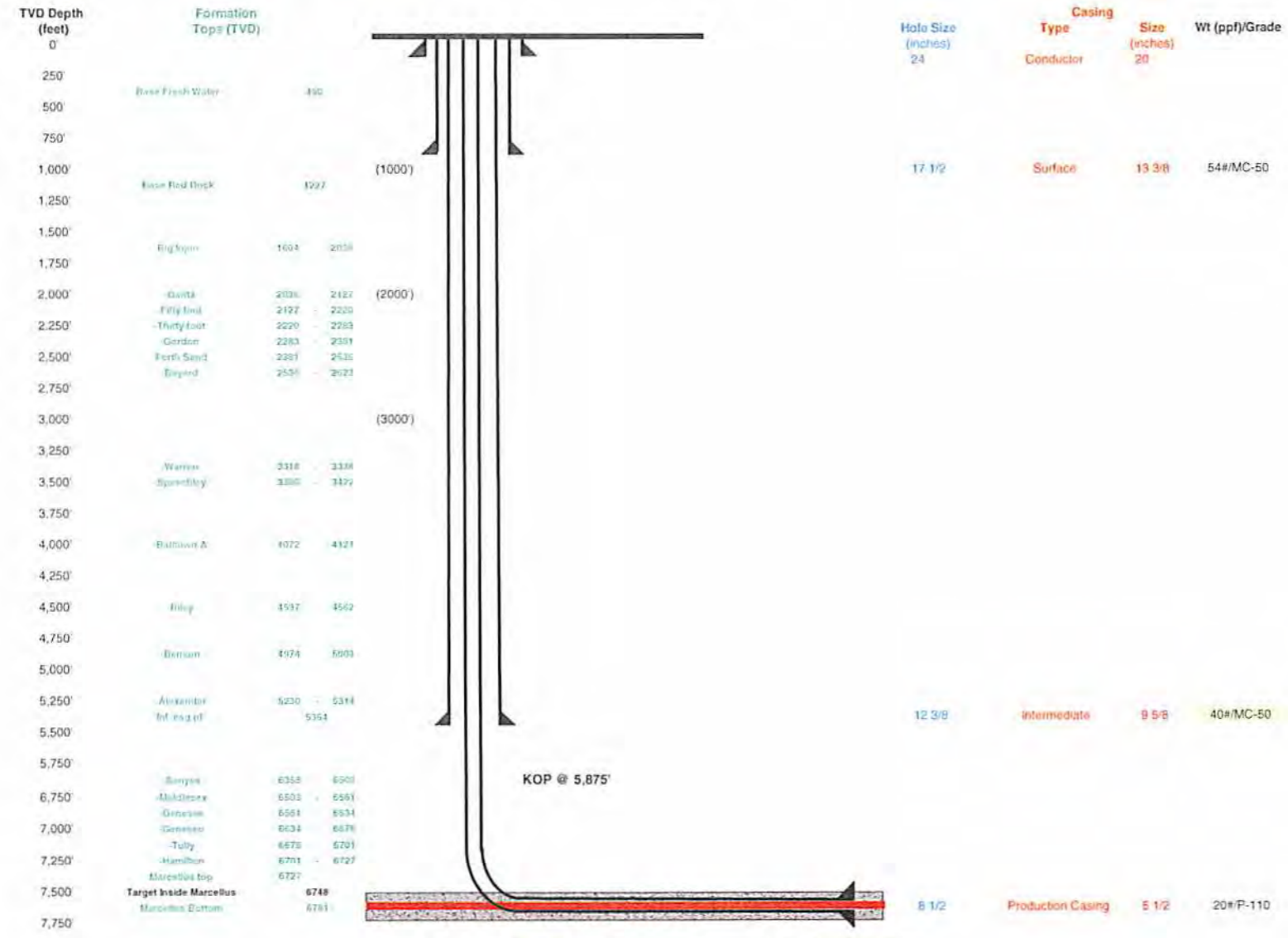


08/22/2014

4701706493

Well 514107 (WEU3H5)  
 EQT Production  
 West Union  
 Doddridge West Virginia

Azimuth 195  
 Vertical Section 2946



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 5875'.  
 Then kick off the horizontal leg into the Marcellus using a slick water frac.

Land curve @ 6,748' ft TVD / 7,764' ft MD  
 Est TD @ 6,748' ft TVD / 9,369' ft MD  
 1,605' ft Lateral



WEST VIRGINIA GEOLOGICAL PROGNOSIS

Horizontal Well  
514107 (WEU3H5)

4701706493

<b>Drilling Objectives:</b>	Marcellus				
<b>County:</b>	Doddridge				
<b>Quad:</b>	West Union				
<b>Elevation:</b>		1213 KB		1200 GL	
<b>Surface location</b>	<b>Northing:</b>	286258.33	<b>Easting:</b>	1642949	
<b>Landing Point</b>	<b>Northing:</b>	284864.6	<b>Easting:</b>	1642446.4	TVD: 6748
<b>Toe location</b>	<b>Northing:</b>	283314.22	<b>Easting:</b>	1642861.85	TVD: 6748
<b>Recommended Azimuth</b>		165 Degrees		Recommended LP to TD:	1,605'

**Proposed Logging Suite:** @ **Intermediate Casing Point:** The open hole logs need to consist of Gamma Ray, Neutron, Density, Induction and Spectral Gamma Ray. **CONTACT LUKE SCHANKEN PRIOR TO LOGGING (412.580.8016)**  
**An e-log should be run for the first well on every horizontal well pad.**  
 GR/LDT/DIL/CNL/Temp/Audio (Allegheny's Air Suite) - pull GR to surface.  
 Mudloggers to be on location at kickoff point to run samples and measure gas thru both the curve and lateral sections.

**Recommended Gas Tests:** 1800, 2050, 2600, Intm Csg. Pt., 3400, 4900, 5250, KOP. (Gas test at any mine void)  
 Gas test during any trip or significant downtime while drilling the lateral section.

Base red rock possible at: 124,280,340,365,434,532,704,738,845,954,1059,1227,...

**ESTIMATED FORMATION TOPS**

Formation	Top (TVD)	Base (TVD)	Lithology	Comments	TOP RR	BASE RR
Fresh Water Zone	1	450		FW @ 309,349,375,407,450,.....	119	124
Washington	30	33 Coal			244	280
Waynesburg A	111	113 Coal			322	340
Uniontown	294	297 Coal			352	365
Redstone	439	440 Coal			409	434
Pittsburgh	509	513 Coal		use Red Rock Possible @ 124,280,340,365,434,532,704,738,845,954,1059,1227,...	517	532
Big Injun	1604	2036 Sandstone		SW @ 960, ..	694	704
Top Devonian	2036				710	738
-Gantz	2036	2127 Silty Sand			832	845
-Fifty foot	2127	2220 Silty Sand			944	954
-Thirty foot	2220	2283 Silty Sand			1039	1059
-Gordon	2283	2381 Silty Sand			1207	1227
-Forth Sand	2381	2536 Silty Sand				
-Bayard	2536	2623 Silty Sand				
-Warren	3318	3338 Silty Sand				
-Speechley	3386	3422 Silty Sand				
-Balltown A	4072	4124 Silty Sand				
-Riley	4537	4562 Silty Sand				
-Benson	4974	5003 Silty Sand				
-Alexander	5230	5314 Silty Sand				
Int. csg pt	5364					
-Elks	5314	6358 Gray Shales and Silts				
-Sonyea	6358	6503 Gray shale				
-Middlesex	6503	6561 Shale				
-Genesee	6561	6634 with black shale				
-Genesee	6634	6676 Black Shale				
-Tully	6676	6701 Limestone				
-Hamilton	6701	6727 calcareous shales				
-Marcellus	6727	6781 Black Shale				
-Purcell	6736	6739 Limestone				
<b>-Lateral Zone</b>	<b>6748</b>	<b>6748</b>		<b>Start Lateral at 6748 ft, drill to 6748 ft</b>		
-Cherry Valley	6758	6761 Limestone				
Onondaga	6781	Limestone				

Target Thickness	54 feet
Anticipated Target Pressure	4543 PSI

**Comments:** Note that this is a TVD prog for a horizontal well. **All measurements taken from estimated KB elevation.** Water and coal information estimated from surrounding well data. Intermediate casing point is recommended 50' beneath the Alexander due to offsetting completions and production in the Alexander formation. Intermediate casing should be cemented into the surface string, per WV regulations. The estimated TD is the TVD landing point for the horizontal section of well, with the plan to then drill to a final TVD of 6748' at the toe of the lateral. The geologic structure is unknown at this time.

**LATERAL DRILLING TOLERANCES**

**Mapview - Left of borehole:** Deviate as little as possible left to avoid planned lateral 513118  
**Mapview - Right of borehole:** Deviate as little as possible right to remain on lease  
**Mapview - TD:** **DO NOT EXTEND** beyond recommended wellbore to avoid lease line.

**RECOMMENDED CASING POINTS**

<b>Fresh Water/Coal</b>	CSG OD	13 3/8	CSG DEPTH:	895	50' past a base of redr
<b>Intermediate 1:</b>	CSG OD	9 5/8	CSG DEPTH:	5364	
<b>Production:</b>	CSG OD	5 1/2	CSG DEPTH:	@ TD	

J Dereume	Author	Date Created	Plat Date	
Prog created:	EVG	3/18/2014	3/11/2014	
revised surface casing and pilot ho	EVG	4/8/2014	3/11/2014	
revised surface casing	EVG	7/11/2014	3/11/2014	

COR.

08/22/2014

4701706493

Well Number: 514107 (WEU3H5)

Casing and Cementing			Deepest Fresh Water: 450'		
Type	Conductor	Mine Protection	Surface	Intermediate	Production
Hole Size, In.	24		17 1/2	12 3/8	8 1/2
Casing Size, OD In.	20	-	13 3/8	9 5/8	5 1/2
Casing Wall Thickness, In.	0.375	-	0.380	0.395	0.361
Depth, MD	40'	-	895'	5,364'	9,869'
Depth, TVD	40'	-	895'	5,364'	6,748'
Centralizers Used	Yes	-	Yes	Yes	Yes
Weight/Grade	81#/MC-50	-	54#/MC-50	40#/MC-50	20#/P-110
New or Used	New	-	New	New	New
Pressure Testing	-	-	20% Greater than exp. Pressure	20% Greater than exp. Pressure	20% greater than exp. fracture pressure
After Fracture Pressure Testing	-	-	-	-	20% greater than exp. shut pressure
ID, in	19.25	-	12.615	8.835	4.778
Burst (psi)	-	-	2,480	3,590	12,640
Collapse (psi)	-	-	1,110	2,470	11,100
Tension (mlbs)	-	-	455	456	587
Cement Class	-	-	-	-	H
Cement Type	Construction	-	1	1	-
Cement Yield	1.18	-	1.21	1.21	1.27/1.86
Meets API Standards	-	-	Yes	Yes	Yes
WOC Time	-	-	Min. 8 hrs	Min. 8 hrs	Min. 8 hrs
Top of Cement (Planned)	Surface	-	Surface	Surface	5,564'
Fill (ft.)	40'	-	895'	5,364'	3,805'
Percent Excess	-	-	20	20	10
Est. Volume (cu ft)	38	-	781	2,111	967
Est. Volume (BBLs)	7	-	139	376	172

08/22/2014

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

Fluids/Cuttings Disposal & Reclamation Plan

Operator Name EQT Production Co. OP Code \_\_\_\_\_  
Watershed (HUC10) Bluestone Creek Quadrangle West Union 7.5'  
Elevation 1200.0 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 ? 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 \_\_\_\_\_ )

Will closed loop system be used ? Yes, The closed loop system will remove drill cuttings from the drilling fluid. The drill cuttings are then prepared for transportation to an off-site disposal facility.

Drilling medium anticipated for this well? Air, freshwater, oil based, etc. Air is used to drill the top-hole sections of the wellbore, Surface, Intermediate, and Pilot hole sections, water based mud is used to drill the curve and lateral

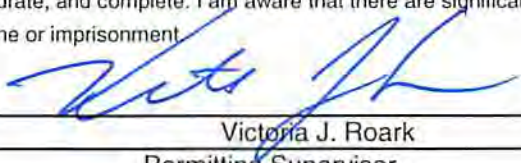
If oil based, what type? Synthetic, petroleum, etc \_\_\_\_\_

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. Of the listed chemicals the following are generally used when drilling on air: lubricant, detergent, defoaming. Water based fluids use the following chemicals: MILBAR, viscosifer, alkalinity control, lime, chloride salts, rate filtration control, deflocculant, lubricant, detergent, defoaming, walnut shell, x-cide, SOLTEX terra

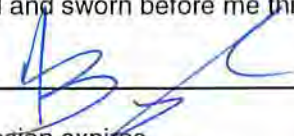
Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Landfill  
- If left in pit and plan to solidify what medium will be used? (Cement, Lime, sawdust) n/a  
- Landfill or offsite name/permit number? See Attached List

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

Subscribed and sworn before me this 21 day of APRIL, 20 14

 Notary Public  
My commission expires 6/27/2018

RECEIVED  
Office of Oil and Gas  
APR 24 2014  
WV Department of Environmental Protection

08/22/2014

Proposed Revegetation Treatment: Acres Disturbed ± 15.50 AC Prevegetation pH 6.5

Lime 3 Tons/acre or to correct to pH 6.5

Fertilize type

Fertilizer Amount 1/3 lbs/acre (500 lbs minimum)

Mulch 2 Tons/acre

Seed Mixtures

Temporary		Permanent	
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 & maintain E+S to WV Dep regulations

Title: Oil & Gas Inspector Date: 4-24-2014

Field Reviewed? ( / ) Yes ( ) No

08/22/2014

RECEIVED  
Oil and Gas  
08/22/2014  
West Virginia Department of Environmental Protection

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

4701706493

**CWS TRUCKING INC.**

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

**BROAD STREET ENERGY LLC**

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

**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

**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

**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

**KING EXCAVATING CO.**

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

**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

RECEIVED 08/22/2014  
CIVIL ENGINEER  
APR 24 2014  
WV DEPARTMENT OF  
ENVIRONMENTAL PROTECTION



Where energy meets innovation.™

# Site Specific Safety Plan

EQT WEU3 Pad

West Union

Doddridge County, WV

For Wells:

512682 512684 513118 513119 514107 \_\_\_\_\_

Date Prepared:

April 11, 2014

*[Signature]*

EQT Production

*Permitting Supervisor*

4-18-14

Date

*Douglas Newton*

WV Oil and Gas Inspector

*Oil & Gas Inspector*

Title

4-24-2014

Date

08/22/2014

# Section V: BOP and Well Control 4701706493

BOP equipment and assembly installation schedule:

<b>BOP Equipment</b>						
Size (in)	Operation	Hole Section	Type	Pressure Class	Test Pressure (psi)	Testing Frequency
13-5/8"	Drilling	Intermediate	Annular	3M	2100	Initial
13-5/8"	Drilling	Pilot	Annular	3M	2100	Initial, Weekly, Trip
13-5/8"	Drilling	Production	Annular	5M	3500	Initial, Weekly, Trip
13-5/8"	Drilling	Production	Blind	5M	4000	Initial, Weekly, Trip
13-5/8"	Drilling	Production	Pipe	5M	4000	Initial, Weekly, Trip
7-1/16"	Completions	Production	Cameron U's	5M	5000	Initial
13-5/8"	Drilling	Pilot (Onondaga Tag)	Annular	5M	4000	Initial, Weekly, Trip

### Wellhead Detail

Size (in)	Type	M.A.W.P. (psi)
13-3/8" SOW x 13-5/8" 5M	Multi-bowl Well Head	5,000
13-5/8" 5M x 7-1/16" 10M	Tubing Head	10,000
2-1/16" 5M	Christmas Tree	5,000

### Well Control Trained Personnel:

- Drilling
  - EQT On-Site Specialist – 2 on rotating hitches.
  - Contract Group's – Tool Pusher & Drillers
- Completions & Production
  - EQT On-Site Specialist

DCM  
4-24-2014

### Notification Procedure

#### Significant Event Notifications

- A detailed record of significant drilling events will be recorded in the EQT Production Well Log Book.
- In addition to the record above, the local inspector of the WV DEP Office of Oil and Gas and Supervisor of EH&S will be notified by the EQT On-Site Specialist for the following events:
  - Lost Circulation
  - Encounter of Hydrogen Sulfide Gas
    - Immediate notification is required of any reading of Hydrogen Sulfide Gas greater than 10ppm
  - Fluid Entry
  - Abnormal Pressures
  - Blow-outs
  - Significant kicks
- Contact information can be found in Section II

#### Emergency Notifications

- In the event emergency response personnel and residents surrounding the work site are affected by specific events during the operation they must be notified as soon as possible by the On-site Specialist or their designee.

#### Flaring Notifications

- The local fire department(s) and/or county dispatch centers must be notified immediately prior to the ignition of a flare.



- ⊙ Denotes to install 15" minimum culvert
- ⊗ Denotes a proposed stream crossing (if applies) \*see table for culvert detail\*

Unless otherwise noted, all roads shown hereon are existing and shall be maintained in accordance with WV D.E.P., Office of Oil and Gas Erosion and Sediment Control Field Manual as revised 2/98

Entrances upon county/state roads shall be maintained in accordance with WV D.O.T. regulations, however, separate permits may be required by the WV D.O.T.

Sediment basins (traps) and appropriate erosion control barriers are to be constructed at all culverts and cross-drains as required in the aforementioned Erosion and Sediment Control Field Manual. Where field conditions dictate, alternative erosion control measures shall be enacted as required.

Earthwork contractors are responsible for notification to the operator and inspector prior to any deviation from this plan.

Temporary seed and mulch all slopes after construction of location.

Cut and stack all marketable timber.

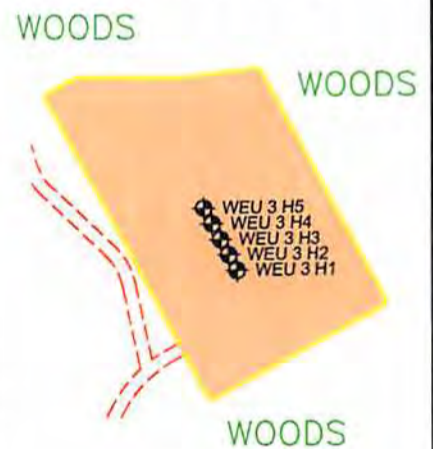
Stacked brush may be used for sediment control.

Applications for separate Public Land Corporation Permits on the access roads stream crossings have been prepared ( if applies ).

Additional culverts and/or other drainage structures and sediment control devices may be required by the WVDEP Oil & Gas Inspector.

Operator is responsible for the coordination with contractor and Allegheny Surveys regarding any changes or additions the state may require.

Proposed WEU 3 Pad



DRAWING IS NOT TO SCALE

SECTION OF THE West Union 7.5' USGS QUADRANGLE		Proposed Disturbance Area	
Projected culvert inventory. (for bid purposes only)		Well Site Location	6.92 Acres
15" minimum diameter culverts	0 Culverts	Proposed Access Road	6.31 Acres
24" minimum diameter culverts	0 Culverts	Approximate Total Disturbance	28.80 Acres
DRAWN BY: Gary Johnson	DATE: March 6, 2014	FILE NO. 155-36-W-13	DRAWING FILE NO. 155-13 WEU 3 H5 Rec Plan

- PROPERTY BOUNDARY
- ROAD
- DITCH
- SILT FENCE
- PROPOSED WELL LOCATION
- BROAD BASED DIP
- EXISTING GATE
- EXISTING CULVERT
- PROPOSED CULVERT
- CROSS DRAIN
- PIT-CUT WALLS
- PIT-COMPACTED WALLS
- AREA OF LAND APPLICATION OF PIT WASTE

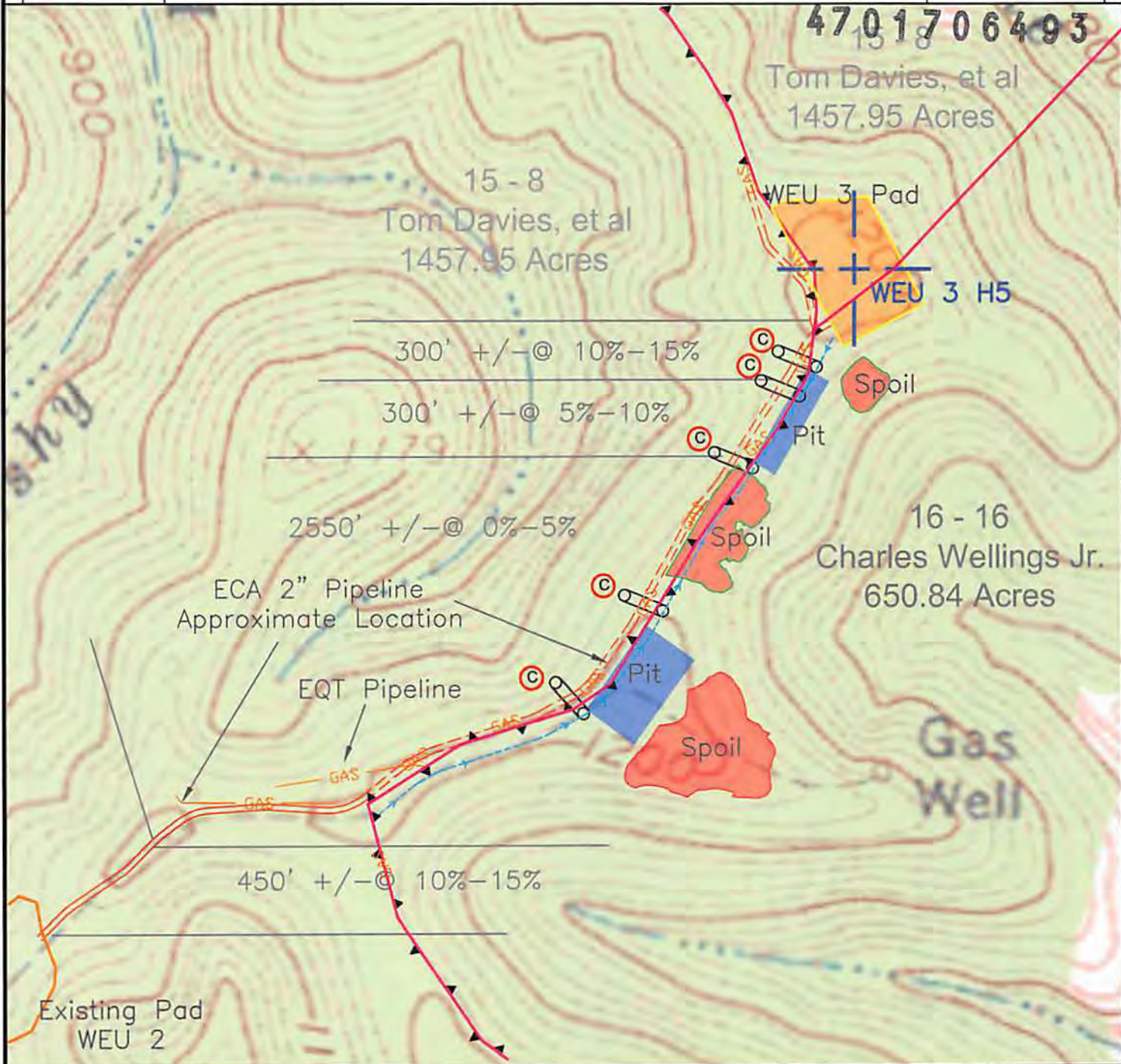


SURVEYING AND MAPPING SERVICES PERFORMED BY:  
**ALLEGHENY SURVEYS, INC.**

1-800-482-8606  
 Birch River Office Phone: (304) 649-8606 Fax: (304) 649-8608  
 237 Birch River Road P.O. Box 438 Birch River, WV 26610

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 APR 24 2014  
 08/22/2014





0' 500' 1000' 1500'



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\*see table for culvert detail\*

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Proposed WEU 3 Pad



08/22/2014

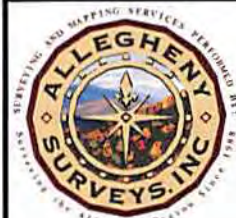
PROPERTY BOUNDARY	
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AREA OF LAND APPLICATION OF PIT WASTE	

SECTION OF THE  
West Union 7.5' USGS QUADRANGLE

Proposed Disturbance Area

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Phone: (304) 649-8606      P.O. Box 438  
Fax: (304) 649-8608      Birch River, WV 26610

**WEU 3  
WV 514107  
EQT Production Company**

LATITUDE 39 - 17 - 30  
LONGITUDE 80 - 45 - 00

WV 514107 coordinates:  
N: 286258.33 Lat: 39.279066  
E: 1642949.00 Long: -80.761337  
UTM N: 4,347,782.13 E: 520,599.75  
WV 514107 Landing Point coordinates:  
N: 284864.60 Lat: 39.275221  
E: 1642448.40 Long: -80.763043  
UTM N: 4,347,354.98 E: 520,453.72  
WV 514107 Bottom Hole coordinates:  
N: 283314.22 Lat: 39.270981  
E: 1642861.85 Long: -80.761499  
UTM N: 4,346,884.77 E: 520,588.16

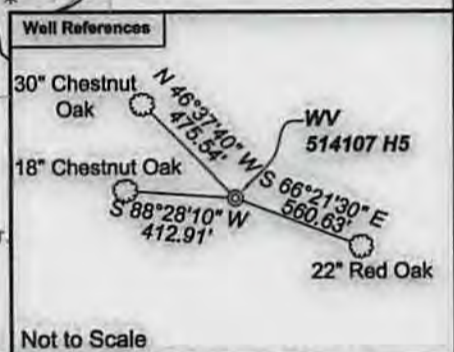
West Virginia Coordinate System of 1927 (North Zone).  
Geographic coordinates are NAD 27.  
UTM coordinates are NAD83, Zone 17, Meters.  
Plat orientation, corner and well ties are based upon the grid north meridian.  
Well location references are based upon the grid north meridian.

- 514107
- 513119
- 512684
- 513118
- 512682

GRID NORTH

- ⊙ Proposed Gas Well
- Located Corner, as noted
- Lease Boundary
- Surface Tract (Approx.)
- Bore Path
- \* Existing Gas Well

ADJOINER TABLE		
TAX MAP PARCEL NO.	ADJOINER	AREA
16 - 16.1	Nelson J. Smith	2.17 Acres
16 - 16.2	John & Joann Warner	4.08 Acres
16 - 16.5	Daniel Wellings	2.0 Acres



(⊙) Denotes Location of Well on United States Topographic Maps



*I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the regulations issued and prescribed by the Department of Environmental Protection.*

*Ben R. Singleton*  
P.S. 2092



FILE NO: 155-36-W-13  
DRAWING NO: WEU 3 H5 514107  
SCALE: 1" = 2000'  
MINIMUM DEGREE OF ACCURACY: 1:2500  
PROVEN SOURCE OF ELEVATION: NGS CORS Station

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

DATE: August 12 20 14  
OPERATOR'S WELL NO. 514107  
API WELL NO  
47 - 017 - 06493 H6A  
STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
(IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW  
LOCATION: ELEVATION: Existing 1228' Proposed 1200' WATERSHED: Bluestone Creek QUADRANGLE: West Union  
DISTRICT: West Union COUNTY: Doddridge  
SURFACE OWNER: Tom Davies, et al. ACREAGE: 1457.95  
ROYALTY OWNER: Lewis Maxwell Heirs LEASE NO: 080620 ACREAGE: 640  
PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY)  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus ESTIMATED DEPTH: IVD 6,727 MD 10,613

WELL OPERATOR: EQT Production Company DESIGNATED AGENT: Rex C. Ray  
ADDRESS: 115 Professional Place PO Box 280 Bridgeport, WV 26330  
ADDRESS: 115 Professional Place PO Box 280 Bridgeport, WV 26330