

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514745

API: 47 - 049 - 02329

Submission: Initial Amended

Notes:

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47-049-02329 County MARION District MANNINGTON
Quad GLOVER GAP Pad Name GLO76 Field/Pool Name _____
Farm name ROBERT E. TONKERY Well Number 514745
Operator (as registered with the OOG) EQT Production Company
Address 625 Liberty Ave. EQT Plaza, Suite 1700 City Pittsburgh State PA Zip 15222

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,379,498.9 Easting 543,861.4
Landing Point of Curve Northing 4,379,321.5 Easting 543,963.7
Bottom Hole Northing 4,378,166.7 Easting 544,561.5

Elevation (ft) 1424 GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
Water base Mud 13.4 ppg barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, modified starch, sodium hydroxide, phosphonates and alkyl phosphates, glutaraldehyde solution, calcium hydroxide, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 9/30/2014 Date drilling commenced 7/16/2015 Date drilling ceased 11/5/2015
Date completion activities began 2/14/2016 Date completion activities ceased 2/21/2016
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

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Freshwater depth(s) ft 263 Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1883,2123,2438 Void(s) encountered (Y/N) depths N
Coal depth(s) ft 662,818,1077,1176 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by: _____

API 47-049 - 02329

Farm name **ROBERT E. TONKERY**

Well number **514745**

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	24"	20"	40'	NEW	A-500	N/A	Y
Surface	17 1/2"	13 3/8"	959'	NEW	J-55	164'	Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	3055'	NEW	A-500	1915'	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	12593'	New	P-110	N/A	N
Tubing							
Packer type and depth set							

Comment Details Cement placed greater than 1000' above KOP

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	38	15.6	1.18	44.84	0	8
Surface	CLASS A	752	15.6	1.20	902.4	0	8
Coal							
Intermediate 1	CLASS A / CLASS A	875 / 194	15.6 / 15.6	1.18 / 1.20	1265.3	0	8
Intermediate 2							
Intermediate 3							
Production	Class A / Class A	615 / 660	15.2 / 15.6	1.07 / 1.84	1872.5	4615'	8+
Tubing							

Drillers TD (ft) 12600'

Loggers TD (ft) 7784'

Deepest formation penetrated MARCELLUS

Plug back to (ft) 6302'

Plug back procedure Pump 2 bbl water, pump 35.2 bbl of 50:50 Class A Poz blend, 1 % BWOC calcium chloride, 0.2% BWOC suspension agent - high temp, 14.20 #, 1.24 yld cement. Pump 2 bbl of water. POOH to 6750' KB.

Pump 2 bbl water, 26 bbl of 50:50 Class A Poz blend, 1 % BWOC calcium chloride, 0.2 % BWOC suspension agent - high temp, 14.20 #, 1.24 yld cement. Pump 2 bbl of water. POOH to 5900' KB.

Pump 2 bbl water. 42 bbl of Class A, 16 #, 1.12 yld cement. Pump wiper ball and 20 bbl of water. Estimated top of cement 6302' KB.

Kick off depth (ft) 6430'

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING

CONDUCTOR: NONE

SURFACE: 3 CENTRALIZERS EVERY 500' from shoe joint to surface

INTERMEDIATE: 7 CENTRALIZERS EVERY 500' from shoe joint to surface

PRODUCTION: 78 Centralizers ran every other joint from 6298' - 12591'

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

API 47- 049 - 02329

Farm name ROBERT E. TONKERY

Well number 514745

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					Please See Attached

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
						Please	See	Attached

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Please insert additional pages as applicable.

API 47- 049 - 02329 Farm name ROBERT E. TONKERY Well number 514745

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
<u>MARCELLUS</u>	<u>7,715.80</u>	<u>TVD</u>	<u>8,044.00</u> <u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 2,504 psi Bottom Hole N/A psi DURATION OF TEST 93.00 hrs

OPEN FLOW Gas 10,680 mcfpd Oil N/A bpd NGL 0.0 bpd Water 809 bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	<u>0</u>		<u>0</u>		

Please insert additional pages as applicable.

Drilling Contractor ALPHA HUNTER DRILLING (RIG 6)
Address P.O. BOX 430 City RENO State OH Zip 45773

Logging Company GYRODATA
Address 601 MAYER ST City BRIDGEVILLE State PA Zip 15017

Cementing Company ALLIED OIL & GAS SERVICES
Address 333 Technology Drive, Suite 290 City Canonsburg State PA Zip 15317

Stimulating Company Keane
Address 2121 Sage Road City Houston State TX Zip 77056

Please insert additional pages as applicable.

Completed by Jim Helmick Telephone (412) 395-5518
Signature [Signature] Title VP Completions Date 5/17/2016

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API 47- 049 - 02329 Farm name ROBERT E. TONKERY Well number 514745

Drilling Contractor Pioneer Drilling Services Rig 72
Address 1083 North 88 Road City Rices Landing State PA Zip 15357

Logging Company Pro Directional
Address 750 Conroe Park North Dr. City Conroe State TX Zip 77303

Logging Company Halliburton Energy Services
Address 121 Champion Way City Cannonsburg State PA Zip 15317

Cementing Company _____
Address _____ City _____ State _____ Zip _____

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Final Formations Well #514745				
Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
SAND/SHALE	1	1	662	662
WASHINGTON COAL	662	662	664	664
SAND/SHALE	664	664	818	818
WAYNESBURG COAL	818	818	820	820
SAND/SHALE	820	820	1,077.00	1,077.00
SEWICKLEY COAL	1,077.00	1,077.00	1,080.00	1,080.00
SAND/SHALE	1,080.00	1,080.00	1,176.00	1,176.00
PITTSBURGH COAL	1,176.00	1,176.00	1,183.00	1,183.00
SAND/SHALE	1,183.00	1,183.00	2,146.00	2,145.80
MAXTON	2,146.00	2,145.80	2,183.00	2,182.80
SAND/SHALE	2,183.00	2,182.80	2,293.00	2,292.80
BIG LIME	2,293.00	2,292.80	2,362.00	2,361.80
SAND/SHALE	2,362.00	2,361.80	2,457.00	2,456.80
BIG INJUN	2,457.00	2,456.80	2,612.00	2,611.80
SAND/SHALE	2,612.00	2,611.80	2,730.00	2,729.80
WEIR	2,730.00	2,729.80	2,750.00	2,749.80
SAND/SHALE	2,750.00	2,749.80	2,938.00	2,937.70
GANTZ	2,938.00	2,937.70	3,097.00	3,096.70
50F	3,097.00	3,096.70	3,253.00	3,252.70
GORDON	3,253.00	3,252.70	3,381.00	3,380.70
BAYARD	3,381.00	3,380.70	3,863.00	3,862.60
WARREN	3,863.00	3,862.60	4,084.00	4,083.60
SPEECHLEY	4,084.00	4,083.60	4,446.00	4,445.50
BALLTOWN A	4,446.00	4,445.50	4,969.00	4,968.50
RILEY	4,969.00	4,968.50	5,528.00	5,527.40
BENSON	5,528.00	5,527.40	5,914.00	5,913.40
ALEXANDER	5,914.00	5,913.40	7,156.00	7,138.20
RHINESTREET	7,156.00	7,138.20	7,252.00	7,233.70
SONYEA	7,252.00	7,233.70	7,415.00	7,390.20
MIDDLESEX	7,415.00	7,390.20	7,473.00	7,442.30
GENESSEE	7,473.00	7,442.30	7,590.00	7,538.20
GENESEO	7,590.00	7,538.20	7,634.00	7,569.70
TULLY	7,634.00	7,569.70	7,692.00	7,606.10
HAMILTON	7,692.00	7,606.10	8,044.00	7,715.80
MARCELLUS	8,044.00	7,715.80		

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514745 47-049-02329-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	12/18/2015	12,592	12,593	10	MARCELLUS
1	2/14/2016	12,446	12,536	32	MARCELLUS
2	2/15/2016	12,296	12,418	40	MARCELLUS
3	2/15/2016	12,146	12,268	40	MARCELLUS
4	2/15/2016	11,996	12,118	40	MARCELLUS
5	2/15/2016	11,846	11,966	40	MARCELLUS
6	2/16/2016	11,696	11,816	40	MARCELLUS
7	2/16/2016	11,546	11,666	40	MARCELLUS
8	2/16/2016	11,396	11,516	40	MARCELLUS
9	2/16/2016	11,249	11,368	40	MARCELLUS
10	2/17/2016	11,096	11,218	40	MARCELLUS
11	2/18/2016	10,946	11,068	40	MARCELLUS
12	2/18/2016	10,796	10,918	40	MARCELLUS
13	2/18/2016	10,646	10,765	40	MARCELLUS
14	2/18/2016	10,496	10,618	40	MARCELLUS
15	2/18/2016	10,346	10,468	40	MARCELLUS
16	2/18/2016	10,194	10,318	40	MARCELLUS
17	2/19/2016	10,046	10,168	40	MARCELLUS
18	2/19/2016	9,896	10,018	40	MARCELLUS
19	2/19/2016	9,746	9,868	40	MARCELLUS
20	2/19/2016	9,596	9,714	40	MARCELLUS
21	2/19/2016	9,446	9,568	40	MARCELLUS
22	2/19/2016	9,296	9,416	40	MARCELLUS
23	2/20/2016	9,144	9,268	40	MARCELLUS
24	2/20/2016	8,996	9,116	40	MARCELLUS
25	2/20/2016	8,846	8,968	40	MARCELLUS
26	2/20/2016	8,696	8,818	40	MARCELLUS
27	2/20/2016	8,549	8,665	40	MARCELLUS
28	2/20/2016	8,396	8,518	40	MARCELLUS
29	2/20/2016	8,246	8,368	40	MARCELLUS
30	2/21/2016	8,096	8,218	40	MARCELLUS
31	2/21/2016	7,946.00	8,868.00	40	MARCELLUS

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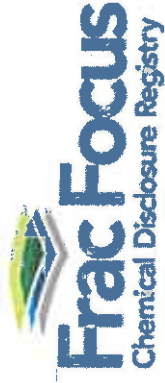
514745 47-049-02329-0000 - Stimulated Stages

Stage Number	Stimulation Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbbls)	Amount of Nitrogen/other (units)
Initiation Sleeve	2/14/2016	19.84	7,359	8,549	5,049	0	812	0
1	2/15/2016	93.9	9,157	9,318	4,492	248,743.00	6,926	0
2	2/15/2016	99.7	9,071	9,333	5,274	250,263.00	6,604	0
3	2/15/2016	83.7	9,260	9,521	5,062	249,420.00	6,567	0
4	2/16/2016	85.3	9,240	9,413	5,485	250,288.00	6,420	0
5	2/16/2016	84.4	9,187	9,369	5,250	250,580.00	6,593	0
6	2/16/2016	83.8	9,233	9,371	5,320	249,440.00	6,488	0
7	2/16/2016	88.9	9,243	9,465	4,673	251,820.00	6,400	0
8	2/16/2016	86.9	9,246	9,440	5,164	253,360.00	6,361	0
9	2/17/2016	86	9,254	9,406	5,492	250,125.00	6,574	0
10	2/17/2016	88.4	9,259	9,373	5,643	250,860.00	6,248	0
11	2/18/2016	85.4	9,205	9,355	5,411	251,600.00	6,159	0
12	2/18/2016	88.1	9,160	9,405	5,055	251,920.00	6,315	0
13	2/18/2016	90.9	9,179	9,414	5,050	251,660.00	5,965	0
14	2/18/2016	89	9,167	9,351	5,400	250,686.00	6,096	0
15	2/18/2016	87.9	9,263	9,376	5,538	251,000.00	5,944	0
16	2/18/2016	86	9,236	9,377	5,109	254,780.00	5,823	0
17	2/19/2016	85.8	9,219	9,368	5,319	251,100.00	6,465	0
18	2/19/2016	89.1	9,121	9,419	5,425	251,060.00	5,934	0
19	2/19/2016	93.6	9,205	9,335	5,350	249,420.00	6,007	0
20	2/19/2016	90.1	9,186	9,345	5,305	251,360.00	5,979	0
21	2/19/2016	101.1	8,332	8,677	4,746	254,580.00	5,899	0
22	2/19/2016	100.2	8,664	9,458	4,673	248,700.00	5,657	0
23	2/20/2016	100.3	8,590	9,210	5,083	250,020.00	5,823	0
24	2/20/2016	94.3	9,112	9,368	5,100	250,240.00	5,899	0
25	2/20/2016	101.2	8,849	9,359	5,380	250,860.00	5,879	0
26	2/20/2016	100.6	8,990	9,350	5,340	252,541.00	5,814	0
27	2/20/2016	100.3	8,668	9,285	5,163	252,880.00	5,791	0
28	2/20/2016	101.1	8,447	9,321	5,259	252,820.00	5,797	0
29	2/21/2016	92.9	8,803	9,492	5,325	249,240.00	6,567	0
30	2/21/2016	97.2	8,737	9,155	5,136	249,648.00	5,701	0
31	2/21/2016	100.5	9,012	9,410	4,670	248,060.00	5,715	0


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 Feb 23 2016

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	2/14/2016
Job End Date	2/21/2016
State	West Virginia
County	Marion
API Number	47-049-02329-00-00
Operator Name	EQT Production
Well Name and Number	514748
Longitude	-80.48953100
Latitude	39.56397200
Datum	NAD83
Federal/Tribal Well	NO
True Vertical Depth	7,716
Total Base Water Volume (gal)	8,031,324
Total Base Non Water Volume	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Keane Group	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.36612	None
Sand (Proppant)	Keane Group	Proppant					
Hydrochloric Acid (15%)	Keane Group	Acidizing	Silica Substrate	14808-60-7	100.00000	10.37259	None
FFR760	Keane Group	Friction Reducer	Hydrochloric Acid	7647-01-0	15.00000	0.03067	None
			Hydrotreated Light Distillate	84742-47-8	30.00000	0.01656	None
			Alkyl Alcohol	Proprietary	10.00000	0.00552	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00276	None
AI 600	Keane Group	Corrosion Inhibitor					
			Ethylene Glycol	107-21-1	40.00000	0.00020	None
			Dimethylformamide	68-12-2	20.00000	0.00070	None
			Cinnamaldehyde	104-55-2	15.00000	0.00008	None
			Nonyl Phenol Ethoxyate, Branched	127087-87-0	15.00000	0.00003	None
			Pyridine, alkyl derivatives, quaternized with benzyl chloride	68909-18-2	15.00000	0.00008	None
			1-Octanol	111-87-5	5.00000	0.00003	None
			2-Butoxyethanol	111-76-2	5.00000	0.00003	None

		11-Decanol	112-30-1	5.00000	0.00003	None
		Methanol	67-56-1	2.50000	0.00007	None
		Triethyl Phosphate	78-40-0	2.50000	0.00007	None
		Alkyl Pyridine	68391-11-7	1.00000	0.00007	None
EC330A	Keane Group	Scale Inhibitor				
		Ethylene Glycol	107-21-1	5.00000	0.00004	None
		Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00004	None
Bactron K-139	Keane Group	Biocide				
		Quaternary ammonium compounds, benzyl-C12-16-alkyldimethyl chlorides	68424-85-1	10.00000	0.00003	None
		Ethanol	64-17-5	5.00000	0.00002	None
		Glutaraldehyde	111-30-8	5.00000	0.00002	None
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.						

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

WV 514745
EQT Production Company
Bower et al LEASE
111.0 Acres ±

Lease No.	Acres	Owner
306684	79	Richard G. Thorne et. al.
993296	35	Ronnie David Starkey
993303	106.5	East Resources Inc. et. al.

Latitude: 39° 35' 00"

WV 514745 Well Point Coordinates

Top Hole Coordinates		
NAD 27 S.P.C. (R.)	N: 389,060.60	E: 1,721,015.30
NAD 27 GEO	LAT: 39.563980	LONG: 80.488521
NAD 83 UTM 17N (M)	N 4,379,488.9	E: 543,861.4
NAD 83 S.P.C. (R.)	N 389,098.3	E: 1,689,576.6

Landing Point Coordinates		
NAD 27 S.P.C. (R.)	N: 388,472.80	E: 1,721,341.21
NAD 27 GEO	LAT: 39.562376	LONG: 80.488403
NAD 83 UTM 17N (M)	N 4,379,321.5	E: 543,963.7
NAD 83 S.P.C. (R.)	N 388,510.4	E: 1,689,902.5

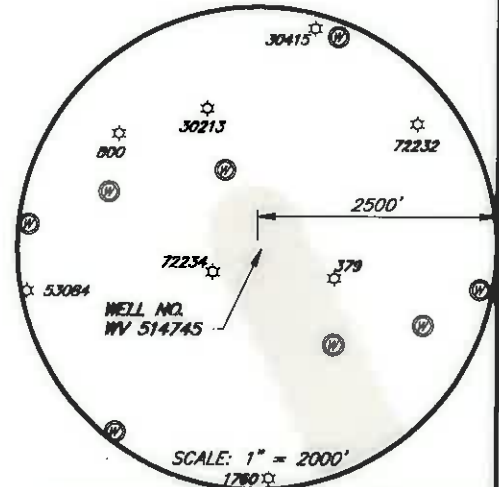
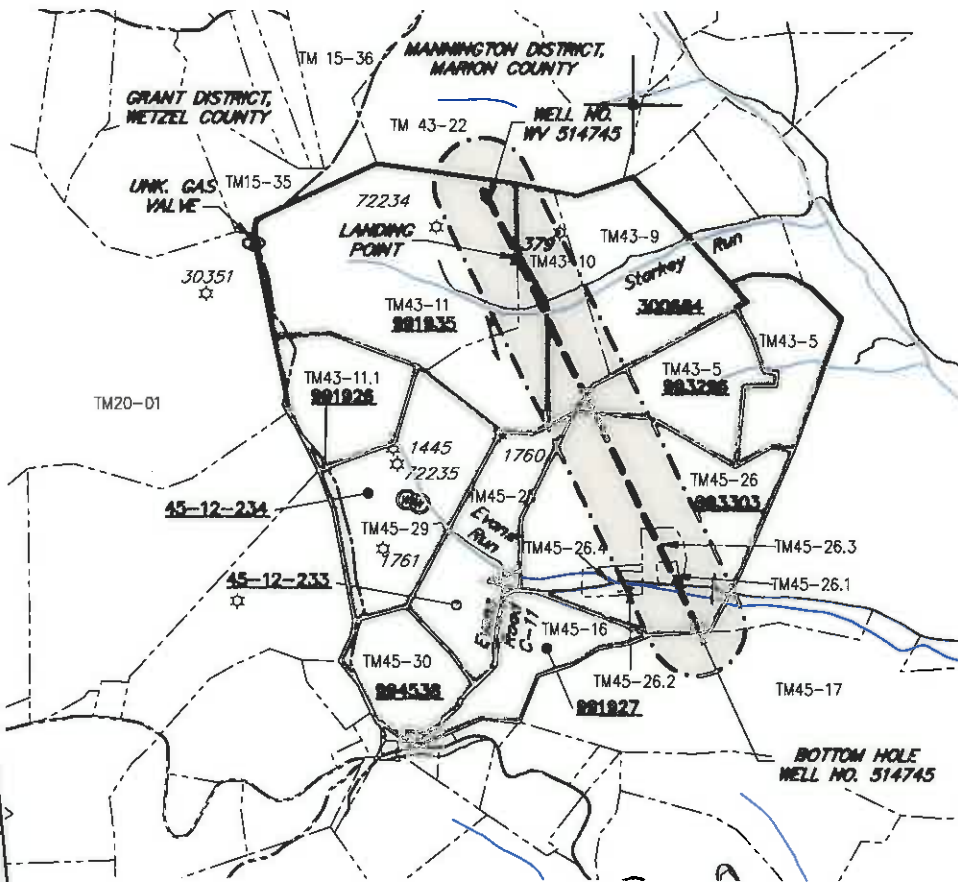
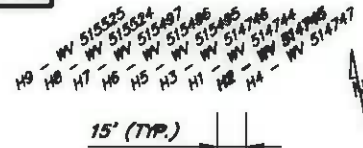
Bottom Hole Coordinates		
NAD 27 S.P.C. (R.)	N: 384,650.84	E: 1,723,239.87
NAD 27 GEO	LAT: 39.551941	LONG: 80.481521
NAD 83 UTM 17N (M)	N 4,379,166.7	E: 544,561.5
NAD 83 S.P.C. (R.)	N 384,688.4	E: 1,691,801.0

LEGEND

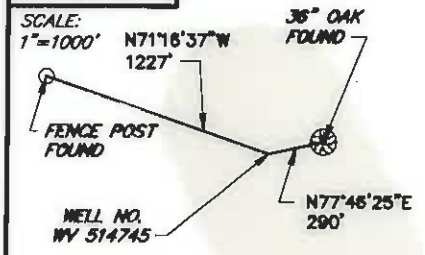
- ☆ EXISTING OIL/GAS WELL
- ⊙ WATER FEATURE
- ▲ WELL HEAD TOP HOLE
- WELL LANDING POINT
- WELL BOTTOM HOLE
- REBAR FOUND
- STONE FOUND
- - - - - WELL LATERAL LINE
- LEASE BOUNDARY
- BUFFER
- PROPERTY LINE
- STREAM
- · - · - · 500' LATERAL COLLECTION

Coordinate Notes
West Virginia Coordinate System of 1927 (North Zone) Based upon Differential GPS Measurements.
Plat orientation, Corner and well ties are based upon the grid north meridian.
Well location references are based upon the grid north meridian.
UTM Coordinates are NAD83, Zone 17 Meters.

GLO 76



Well References



(+) 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 REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



15 CAD FILE: GLO76_WELL PLAT_12-01-2015.DWG

FILE NO.: EES-80635
DRAWING NO.: GLO76_Well Plat
SCALE: 1" = 2000'
MINIMUM DEGREE

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DATE DECEMBER 18, 20 15
OPERATORS WELL NO. WV 514745