

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 515497

API: 47 - 049 - 02332

Submission: Initial Amended

Notes:

Received
Office of Oil & Gas
MAY 26 2016

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

API 47-049-02332 County MARION District MANNINGTON
Quad GLOVER GAP. WV Pad Name GLO76 Field/Pool Name _____
Farm name ROBERT E. TONKERY Well Number 515497
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 4,379,502.3 Easting 543,843.5
Landing Point of Curve Northing 4,379,358.1 Easting 543,686.8
Bottom Hole Northing 4,378,123.9 Easting 544,326.8

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 12.4 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 09/30/2014 Date drilling commenced 7/16/2015 Date drilling ceased 12/4/2015
Date completion activities began 2/22/2016 Date completion activities ceased 2/28/2016
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

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

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 652,808,1067,1166 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by: _____

API 47-049 - 02332

Farm name **ROBERT E. TONKERY**

Well number **515497**

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	163'	Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	3,063'	NEW	A-500	1120'	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	12,855'	NEW	P-110	N/A	N
Tubing							
Packer type and depth set							

Comment Details N/A

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	753	15.6	1.20	903.6	0	8
Coal							
Intermediate 1	CLASS A / CLASS A	970 / 210	15.6 / 15.6	1.18 / 1.20	1396.6	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS H / CLASS H	1460 / 690	15.2 / 15.6	1.07 / 1.84	2831.8	1,070'	24+
Tubing							

Drillers TD (ft) 12,866'

Loggers TD (ft) N/A

Deepest formation penetrated MARCELLUS

Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 5,967'

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'

INTERMEDIATE: 8 CENTRALIZERS EVERY 500'

PRODUCTION: Composite body spiral centralizers installed every joint from bottom to 2,974'

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WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

API 47- 049 - 02332 Farm name ROBERT E. TONKERY Well number 515497

Drilling Contractor Pioneer Drilling Services
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 _____
Address _____ City _____ State _____ Zip _____

Cementing Company C&J Energy Services (Nabors)
Address 2504 Smith Creek Road City Waynesburg State PA Zip 15370

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515497 Final Formations API #47-04902332				
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	662	662	664	664
SAND/SHALE	664	664	818	818
WAYNESBURG	818	818	820	820
SAND/SHALE	820	820	1,077.00	1077
SEWICKLEY	1,077.00	1077	1,080.00	1080
SAND/SHALE	1,080.00	1080	1,176.00	1176
PITTSBURGH	1,176.00	1176	1,183.00	1183
SAND/SHALE	1,183.00	1183	2,146.00	2146
MAXTON	2,146.00	2146	2,183.00	2183
SAND/SHALE	2,183.00	2183	2,293.00	2293
BIG LIME	2,293.00	2293	2,362.00	2362
SAND/SHALE	2,362.00	2362	2,457.00	2457
BIG INJUN	2,457.00	2457	2,612.00	2612
SAND/SHALE	2,612.00	2612	2,730.00	2730
WEIR	2,730.00	2730	2,750.00	2750
SAND/SHALE	2,750.00	2750	2,938.00	2938
GANTZ	2,938.00	2938	3,098.00	3098
50F	3,098.00	3098	3,253.00	3253
GORDON	3,253.00	3253	3,382.00	3382
BAYARD	3,382.00	3382	3,864.00	3864
WARREN	3,864.00	3864	4,085.00	4085
SPEECHLEY	4,085.00	4085	4,446.00	4446
BALLTOWN A	4,446.00	4446	4,969.00	4969
RILEY	4,969.00	4969	5,528.00	5528
BENSON	5,528.00	5528	5,915.00	5915
ALEXANDER	5,915.00	5915	7,157.00	7157
RHINESTREET	7,157.00	7157	7,219.00	7219
SONYEA	7,219.00	7219	7,380.00	7,213.60
MIDDLESEX	7,380.00	7,213.60	7,434.00	7,259.50
GENESSEE	7,434.00	7,259.50	7,527.00	7,338.10
GENESEO	7,527.00	7,338.10	7,804.00	7,541.10
TULLY	7,804.00	7,541.10	7,847.00	7,566.10
HAMILTON	7,847.00	7,566.10	8,099.00	7,666.20
MARCELLUS	8,099.00	7,666.20		

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515497 47-049-02332-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	12/18/2016	12,854	12,855	10	MARCELLUS
1	2/22/2016	12,708	12,800	32	MARCELLUS
2	2/23/2016	12,558	12,680	40	MARCELLUS
3	2/23/2016	12,408	12,530	40	MARCELLUS
4	2/23/2016	12,258	12,380	40	MARCELLUS
5	2/23/2016	12,108	12,230	40	MARCELLUS
6	2/23/2016	11,958	12,080	40	MARCELLUS
7	2/24/2016	11,808	11,928	40	MARCELLUS
8	2/24/2016	11,658	11,780	40	MARCELLUS
9	2/24/2016	11,508	11,630	40	MARCELLUS
10	2/24/2016	11,358	11,480	40	MARCELLUS
11	2/24/2016	11,208	11,330	40	MARCELLUS
12	2/25/2016	11,058	11,176	40	MARCELLUS
13	2/25/2016	10,908	11,030	40	MARCELLUS
14	2/25/2016	10,761	10,880	40	MARCELLUS
15	2/25/2016	10,608	10,730	40	MARCELLUS
16	2/25/2016	10,458	10,580	40	MARCELLUS
17	2/25/2016	10,308	10,427	40	MARCELLUS
18	2/26/2016	10,158.00	10,280.00	40	MARCELLUS
19	2/26/2016	10,008.00	10,127.00	40	MARCELLUS
20	2/26/2016	9,858.00	9,980.00	40	MARCELLUS
21	2/26/2016	9,708.00	9,828.00	40	MARCELLUS
22	2/26/2016	9,558.00	9,680.00	40	MARCELLUS
23	2/26/2016	9,408.00	9,530.00	40	MARCELLUS
24	2/26/2016	9,258.00	9,378.00	40	MARCELLUS
25	2/27/2016	9,108.00	9,230.00	40	MARCELLUS
26	2/27/2016	8,961.00	9,080.00	40	MARCELLUS
27	2/27/2016	8,808.00	8,930.00	40	MARCELLUS
28	2/27/2016	8,658.00	8,780.00	40	MARCELLUS
29	2/27/2016	8,508.00	8,630.00	40	MARCELLUS
30	2/27/2016	8,358.00	8,476.00	40	MARCELLUS
31	2/27/2016	8,208.00	8,330.00	40	MARCELLUS
32	2/28/2016	8,058.00	8,180.00	40	MARCELLUS

515497 47-049-02332-0000 - 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 (bbls)	Amount of Nitrogen/other (units)
Initiation Sleeve	2/22/2016	22.3	8,489	9,099	5,278	0	880	0
1	2/22/2016	88.1	8,724	9,158	4,439	251,140.00	6,856	0
2	2/23/2016	95.2	8,863	9,231	4,810	250,200.00	6,869	0
3	2/23/2016	97.9	9,124	9,304	4,944	250,492.00	6,339	0
4	2/23/2016	100.8	9,092	9,235	4,780	254,110.00	6,188	0
5	2/23/2016	99.7	9,132	9,277	5,377	249,100.00	6,146	0
6	2/23/2016	99	9,176	9,290	4,808	253,300.00	6,208	0
7	2/24/2016	100.7	9,033	9,154	4,981	254,220.00	6,160	0
8	2/24/2016	101.4	8,941	9,203	5,371	252,600.00	6,048	0
9	2/24/2016	101.3	8,884	9,130	5,247	252,700.00	6,090	0
10	2/24/2016	100.5	8,954	9,266	5,315	250,540.00	5,888	0
11	2/24/2016	100.9	8,948	9,221	5,294	249,980.00	6,181	0
12	2/25/2016	100.8	8,775	8,937	5,192	250,240.00	6,088	0
13	2/25/2016	101	8,888	9,149	5,124	250,680.00	6,051	0
14	2/25/2016	101.2	8,737	9,054	5,093	249,760.00	6,034	0
15	2/25/2016	101	8,753	8,991	5,348	250,960.00	5,993	0
16	2/25/2016	101.6	8,540	8,975	5,411	249,620.00	5,850	0
17	2/25/2016	101.5	8,609	8,793	5,327	249,660.00	5,989	0
18	2/26/2016	101.4	8,551	8,934	5,105	247,440.00	6,002	0
19	2/26/2016	101.36	8,865	9,351	5,250	251,160.00	5,940	0
20	2/26/2016	101.4	8,854	9,357	5,423	249,460.00	6,060	0
21	2/26/2016	102.12	8,887	9,155	5,503	252,140.00	5,964	0
22	2/26/2016	101	8,362	8,668	5,296	249,920.00	5,871	0
23	2/26/2016	99.5	8,964	9,284	5,369	251,540.00	5,924	0
24	2/26/2016	101.3	8,538	8,945	5,150	248,020.00	5,827	0
25	2/27/2016	102.1	8,445	8,971	5,579	249,540.00	5,812	0
26	2/27/2016	101.06	8,810	9,304	5,385	252,640.00	5,906	0
27	2/27/2016	101.76	8,438	8,708	5,219	251,640.00	5,933	0
28	2/27/2016	101.71	8,570	8,801	5,083	251,760.00	5,899	0
29	2/27/2016	102	8,511	8,863	5,468	252,200.00	5,836	0
30	2/27/2016	95.8	8,779	8,946	5,581	251,380.00	6,041	0
31	2/27/2016	100	8,990	9,130	5,117	250,420.00	5,737	0
32	2/28/2016	99	8,730	8,936	5,251	249,340.00	5,659	0

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	2/22/2016
Job End Date:	2/28/2016
State:	West Virginia
County:	Marion
API Number:	47-049-02332-00-00
Operator Name:	EQT Production
Well Name and Number:	515497
Longitude:	-80.48979200
Latitude:	39.56398100
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,666
Total Base Water Volume (gal)	8,159,298
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	89.20943	None
Sand/Proppant:	Keane Group	Proppant	Silica Substrate	14808-60-7	100.00000	10.5180	None
LD-2250	Multi-Chem Group LLC	Friction Reducer	Polyacrylate	Proprietary	30.00000	0.01495	None
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.01495	None
			Ethoxylated alcohol	Proprietary	5.00000	0.00249	None
			Fatty nitrogen derived amides	Proprietary	5.00000	0.00249	None
			Sodium chloride	7647-14-5	5.00000	0.00249	None
Hydrochloric Acid (1.5%)	Keane Group	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.03104	None
LD-2550	Multi-Chem Group LLC	Additive	Inner salt of alkyl amines	Proprietary	60.00000	0.00596	None
			Sodium chloride	7647-14-5	10.00000	0.00099	None
FFR760	Keane Group	Friction Reducer	Hydrotreated Light Distillate	64742-47-8	30.00000	0.00160	None
			Alkyl Alcohol	Proprietary	10.00000	0.00053	None

AI 600	Keane Group	Oxyalkylated alcohol A	Proprietary	5.00000	0.00027	None
	Corrosion inhibitor					
		Ethylene Glycol	107-21-1	40.00000	0.00020	None
		Dimethylformamide	68-12-2	20.00000	0.00010	None
		Nonyl Phenol Ethoxylate Branched	127387-87-0	15.00000	0.00008	None
		Cinnamialdehyde	104-55-2	15.00000	0.00008	None
		Pyridine, alkyl derivatives, quaternized with benzyl chloride	8899-18-2	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
		1-Decanol	112-30-1	5.00000	0.00003	None
		Triethyl Phosphate	78-40-0	2.50000	0.00001	None
		Methanol	67-56-1	2.50000	0.00001	None
		Alkyl Pyridine	88391-11-7	1.00000	0.00001	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 515497
EQT Production Company
Bower et al LEASE
111.0 Acres ±

Lease No.	Acres	Owner
991926	30	Kennie S. Kettner Jr. et al.
48-12-234	80.17	Trans Energy
48-12-233	40.8	Trans Energy
993303	106.5	East Resources Inc. et al.
991927	27	Dellah Harris et al.

Latitude: 39° 35' 00"

WV 515497 Well Point Coordinates

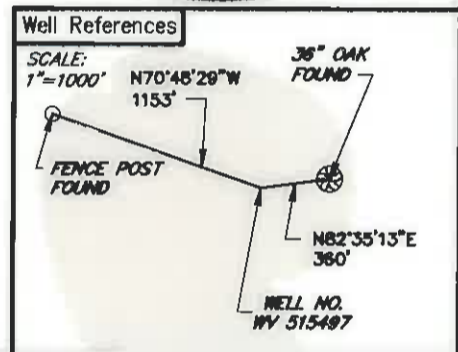
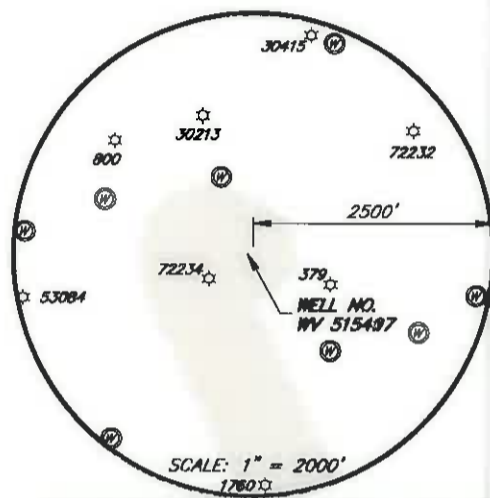
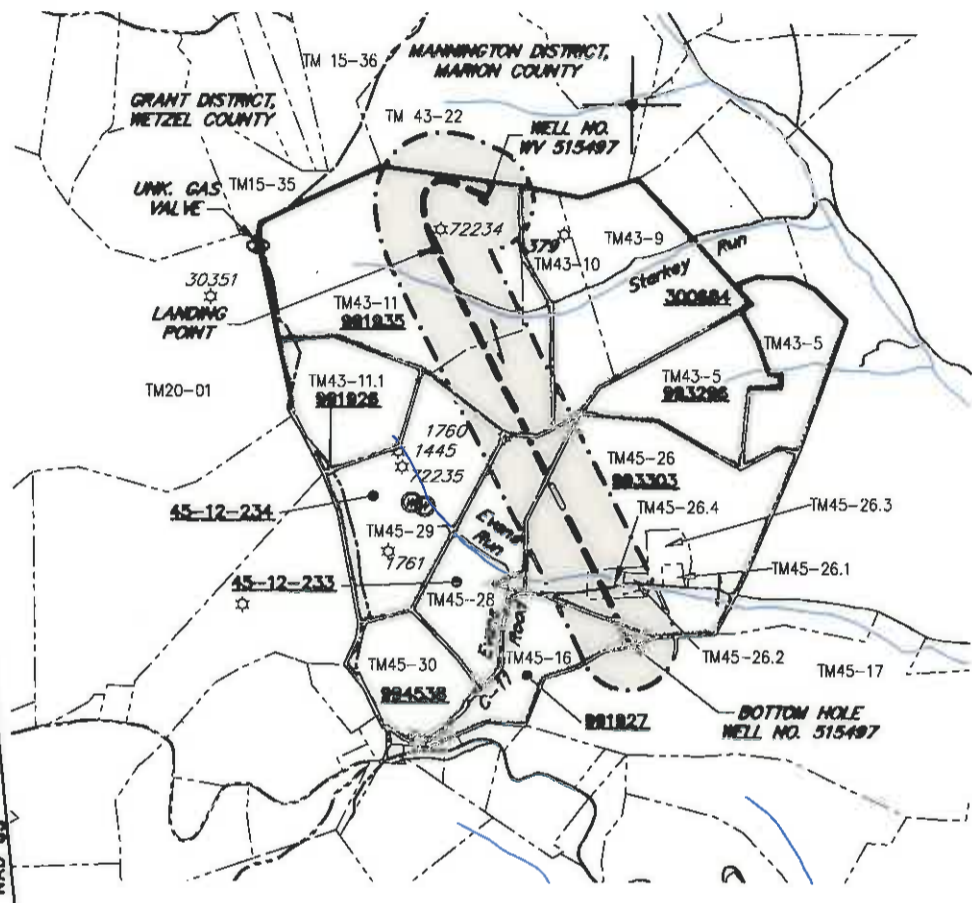
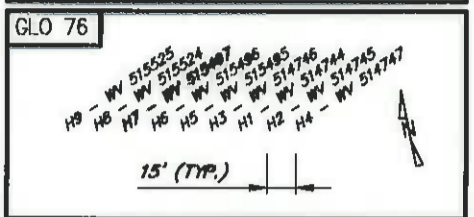
Top Hole Coordinates		
NAD 27 S.P.C. (FL)	N: 389,072.603	E: 1,720,956.546
NAD 27 GEO	LAT: 39.564011	LONG: 80.489790
NAD 83 UTM 17N (M)	N 4,379,502.3	E: 543,843.5
NAD 83 S.P.C. (FL)	N 389,110.2	E: 1,689,517.8
Landing Point Coordinates		
NAD 27 S.P.C. (FL)	N: 388,608.178	E: 1,720,434.536
NAD 27 GEO	LAT: 39.562720	LONG: 80.491624
NAD 83 UTM 17N (M)	N 4,379,358.1	E: 543,686.8
NAD 83 S.P.C. (FL)	N 388,645.8	E: 1,688,995.8
Bottom Hole Coordinates		
NAD 27 S.P.C. (FL)	N: 384,523.115	E: 1,722,467.344
NAD 27 GEO	LAT: 39.551567	LONG: 80.484255
NAD 83 UTM 17N (M)	N 4,378,123.9	E: 544,326.8
NAD 83 S.P.C. (FL)	N 384,560.7	E: 1,691,028.4

Longitude: 80° 27' 30"

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
- 300' 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.



(+) 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.

[Signature]



FILE NO.: EES-60635
DRAWING NO.: GLO76 Well Plat
SCALE: 1" = 2000'
MINIMUM DEGREE OF ACCURACY: ±3'
PROVEN SOURCE OF ELEVATION: GPS

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

DATE: DECEMBER 18, 2015
OPERATORS WELL NO. WV 515497
API WELL NO. 02332
STATE: 47 COUNTY: 049 PERMIT: 02322

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL (IF GAS) PRODUCTION: STORAGE DEEP SHALLOW
LOCATION, ELEVATION: 1424' (Ground) 1455' (Prop.) WATERSHED: Starkey Run QUADRANGLE: GLOVER GAP, WV
DISTRICT: MANNINGTON COUNTY: Marion
SURFACE OWNER: Robert E. Tonkary ACREAGE: 111.00± AC
ROYALTY OWNER: Lynn Ann Brower, et al LEASE NO.: 991935 ACREAGE: 111.00± AC
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: 7,675'

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