

APPROVED

NAME:

DATE:

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 512478

API: 47 - 017 - 06392

Submission: Initial Amended

Notes: Inj Test (1.01, 3.01, 3.02, 3.03, 9.01)

Correction to Production Cement Top
(MD)

RECEIVED
Office of Oil and Gas

DEC 21 2015

WV Department of
Environmental Protection

AX04/01/2016

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

API 47 - 017 - 06392 County Doddridge District 8
Quad Oxford Pad Name OXF149 Field/Pool Name _____
Farm name Harper, Lucy E. Well Number 512478
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 4,341,349 Easting 517,189
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing 4,342,170 Easting 516,789

Elevation (ft) 1240 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 11.5 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 1/21/2014 Date drilling commenced 7/10/2014 Date drilling ceased 11/9/2014
Date completion activities began 5/9/2015 Date completion activities ceased 5/19/2015
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

Freshwater depth(s) ft 438 Open mine(s) (Y/N) depths No
Salt water depth(s) ft N/A Void(s) encountered (Y/N) depths No
Coal depth(s) ft 642 Cavern(s) encountered (Y/N) depths No
Is coal being mined in area (Y/N) No

Reviewed by: _____

04/01/2016

API 47-017 - 06392 Farm name Harper, Lucy E. Well number 512478

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade w/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	24"	20"	40'	New	MC-50, 81.#/ft	N/A	Yes
Surface	17-1/2"	13-3/8"	903.0'	New	J-55, 54.5#/ft	N/A'	Yes
Coal							
Intermediate 1	12-3/8"	9-5/8"	3,113'	New	A-500, 40#/ft	1,336'	Yes
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	9,567'	New	P-110, 20lb/ft	N/A	No
Tubing							
Packer type and depth set							

Comment Details _____

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	57.82	0	8
Surface	Class A	771	15.6	1.19	1094	0	8
Coal							
Intermediate 1	Class A / Class A	923 / 215 / 1138	14.2/15.6/15.6	1.26/1.18/1.18	2248.4	0	8
Intermediate 2							
Intermediate 3							
Production	Class A / Class H	585 / 355 / 940	14.2 / 15.2	1.26 / 1.97	1,436	3,507'	72
Tubing							

Drillers TD (ft) 9,572' Loggers TD (ft) N/A

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 5,500'

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 20" Conductor - N/A

13-3/8" Surface - Bowspring Centralizers set at 71', 526', 901'

9-5/8" Intermediate - Bowspring Centralizers set at 408', 872', 1,336', 1,800', 2,265', 2,688', 3,112'

5-1/2" Production- Composite bodied centralizers on every joint from Shoe track up to 500' above KOP

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

Drilling Contractor: Patterson UTI

Address: 207 Carlton Drive

City: Eighty Four State: PA

Zip: 15330

Cementing Company Nabors Well Services

Address 2504 Smith Creek Road

City Waynesburg

State PA

Zip 15370

Logging Company _____

Address _____

City _____

State _____

Zip _____

512478 Final Formations API#47-017-06392

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FRESH WATER ZONE	1		438	
SANDSTONE/SHALE	1		642	
COAL	642		645	
SANDSTONE/SHALE	645		1,518.00	
MAXTON	1,518.00		1,863.00	
BIG LIME	1,863.00		1,923.00	
KEENER	1,923.00		2,153.00	
WEIR	2,153.00		2,353.00	
BEREA	2,353.00		2,365.00	
GANTZ	2,365.00		2,448.00	
50F	2,448.00		2,557.00	
30F	2,557.00		2,596.00	
GORDON	2,596.00		2,702.00	
4TH	2,702.00		2,839.00	
5TH	2,839.00		2,878.00	
BAYARD	2,878.00		3,213.00	
WARREN	3,213.00		3,283.00	
SPEECHLEY	3,283.00		3,810.00	
BALLTOWN A	3,810.00		3,965.00	
BALLTOWN B	3,965.00		4,160.00	
BRADFORD	4,160.00		4,405.00	
RILEY	4,405.00		4,837.00	
BENSON	4,837.00		5,099.00	
ALEXANDER	5,099.00		5,792.00	5,784.50
RHINESTREET	5,792.00	5,784.50	6,056.00	6,044.90
RHINESTREET UPPER	6,056.00	6,044.90	6,330.00	6,315.90
SONYEA	6,330.00	6,315.90	6,500.00	6,470.60
MIDDLESEX	6,500.00	6,470.60	6,570.00	6,526.90
GENESSEE	6,570.00	6,526.90	6,670.00	6,596.90
GENESEO	6,670.00	6,596.90	6,754.00	6,644.10
TULLY	6,754.00	6,644.10	6,800.00	6,665.40
HAMILTON	6,800.00	6,665.40	6,850.00	6,685.30
MARCELLUS	6,850.00	6,685.30		

PHOENIX
TECHNOLOGY SERVICES



EQT Production - Marcellus

Doddridge County, WV Grid

Doddridge County 512478

Well #512478

Main Wellbore

Design: 512478 As Drilled Surveys

Standard Survey Report

14 November, 2014



Where energy meets innovation.

04/01/2016



Phoenix
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 512478
Company:	EQT #reservoir - Marcellus	TVD Reference:	KB @ 1283.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB @ 1283.0usft
Site:	Doddridge County 512478	North Reference:	Grid
Well:	Well #512478	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	512478 As Drilled Surveys		

Project	Doddridge County, WV Grid		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	West Virginia North 4701		Using geodetic scale factor

Site	Doddridge County 512478		
Site Position:	Northing:	265,331.00 usft	Latitude: 39.22
From: Map	Easting:	1,631,403.80 usft	Longitude: -80.80
Position Uncertainty:	0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: -0.83 °

Well	Well #512478		
Well Position	+N/-S	0.0 usft	Northing: 265,331.00 usft
	+E/-W	0.0 usft	Easting: 1,631,403.80 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
			Ground Level: 1,240.0 usft

Wellbore	Main Wellbore		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	10/20/2014	-8.46	66.73	52,218

Design	512478 As Drilled Surveys		
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Audit Notes:

Version: 1.0 Phase: ACTUAL Tie On Depth: 0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	335.00

Survey Program	Date	From (')	To (usft)	Survey (Wellbore)	Tool Name	Description
	11/14/2014	0.00	5,472.0	512478 Gyrodata Gyros (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop
		0.00	9,572.0	512478 PHX MWD (Main Wellbore)	MWD+IGRF	MWD+IGRF v3 standard declination

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	-1,263.0	0.0	0.0	0.0	0.00	0.00	0.00
110.0	0.59	104.24	110.0	-1,153.0	-0.1	0.5	-0.4	0.54	0.54	0.00
210.0	0.59	115.05	210.0	-1,053.0	-0.5	1.5	-1.1	0.11	0.00	10.81
310.0	0.46	128.20	310.0	-953.0	-1.0	2.3	-1.8	0.18	-0.13	13.15
410.0	0.34	131.89	410.0	-853.0	-1.4	2.8	-2.5	0.12	-0.12	3.69
510.0	0.30	131.67	510.0	-753.0	-1.8	3.2	-3.0	0.04	-0.04	-0.22
610.0	0.37	128.29	610.0	-653.0	-2.1	3.7	-3.5	0.07	0.07	-3.38
710.0	0.36	138.49	710.0	-553.0	-2.6	4.2	-4.1	0.07	-0.01	10.20



Phoenix
Survey Report



Database:	EDM 5000.1 Single User Op	Local Co-ordinate Reference:	Site Doddridge County 512478
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1263 Gush
Project:	Doddridge County, WV Grid	MD Reference:	KB @ 1263 Gush
Site:	Doddridge County 512478	North Reference:	End
Well:	Well #512478	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	512478 Az Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
810.0	0.32	145.27	810.0	-453.0	-3.0	4.5	-4.7	0.06	-0.04	6.78
910.0	0.34	140.55	910.0	-353.0	-3.5	4.9	-5.2	0.03	0.02	-4.72
1010.0	0.36	159.15	1,010.0	-253.0	-4.0	5.2	-5.8	0.11	0.02	18.60
1110.0	0.41	174.15	1,110.0	-153.0	-4.7	5.3	-6.5	0.11	0.05	15.00
1210.0	0.45	172.49	1,210.0	-53.0	-5.4	5.4	-7.2	0.04	0.04	-1.66
1310.0	0.41	184.11	1,310.0	47.0	-6.2	5.4	-7.9	0.10	-0.04	11.62
1410.0	0.40	183.54	1,410.0	147.0	-6.9	5.4	-8.5	0.01	-0.01	-0.57
1510.0	0.41	187.47	1,510.0	247.0	-7.6	5.3	-9.1	0.03	0.01	3.93
1610.0	0.49	165.61	1,610.0	347.0	-8.3	5.4	-9.8	0.19	0.08	-21.86
1710.0	0.76	146.47	1,710.0	447.0	-9.3	5.9	-10.9	0.34	0.27	-19.14
1810.0	0.79	143.68	1,809.9	546.9	-10.4	6.6	-12.2	0.05	0.03	-2.79
1910.0	0.69	143.99	1,909.9	646.9	-11.5	7.4	-13.5	0.10	-0.10	0.31
2010.0	0.46	155.19	2,009.9	746.9	-12.3	7.9	-14.5	0.25	-0.23	11.20
2110.0	0.50	157.38	2,109.9	846.9	-13.1	8.2	-15.3	0.04	0.04	2.19
2210.0	0.44	162.80	2,209.9	946.9	-13.8	8.5	-16.2	0.07	-0.06	5.42
2310.0	0.51	168.99	2,309.9	1,046.9	-14.7	8.7	-17.0	0.09	0.07	6.19
2410.0	0.31	165.17	2,409.9	1,146.9	-15.4	8.9	-17.7	0.20	-0.20	-3.82
2510.0	0.30	174.85	2,509.9	1,246.9	-15.9	9.0	-18.2	0.05	-0.01	9.68
2610.0	0.19	175.89	2,609.9	1,346.9	-16.3	9.0	-18.6	0.11	-0.11	1.04
2710.0	0.09	186.84	2,709.9	1,446.9	-16.5	9.0	-18.8	0.10	-0.10	10.75
2810.0	0.18	151.71	2,809.9	1,546.9	-16.8	9.1	-19.0	0.12	0.09	-34.93
2910.0	0.15	179.89	2,909.9	1,646.9	-17.0	9.2	-19.3	0.09	-0.03	28.18
3010.0	0.14	193.54	3,009.9	1,746.9	-17.3	9.1	-19.5	0.04	-0.01	13.65
3110.0	0.09	155.86	3,109.9	1,846.9	-17.5	9.1	-19.7	0.09	-0.05	-37.68
3210.0	0.18	170.57	3,209.9	1,946.9	-17.7	9.2	-19.9	0.10	0.09	14.71
3310.0	0.15	166.21	3,309.9	2,046.9	-18.0	9.2	-20.2	0.03	-0.03	-4.36
3410.0	0.20	136.24	3,409.9	2,146.9	-18.2	9.4	-20.5	0.10	0.05	-29.97
3510.0	0.30	138.10	3,509.9	2,246.9	-18.6	9.7	-20.9	0.10	0.10	1.86
3610.0	0.17	142.42	3,609.9	2,346.9	-18.9	10.0	-21.3	0.13	-0.13	4.32
3710.0	0.16	105.24	3,709.9	2,446.9	-19.0	10.2	-21.5	0.11	-0.01	-37.18
3810.0	0.13	123.41	3,809.9	2,546.9	-19.1	10.4	-21.7	0.05	-0.03	18.17
3910.0	0.25	317.59	3,909.9	2,646.9	-19.0	10.4	-21.6	0.38	0.12	-165.82
4010.0	0.91	278.26	4,009.9	2,746.9	-18.7	9.4	-21.0	0.73	0.66	-39.33
4110.0	1.16	271.32	4,109.9	2,846.9	-18.6	7.6	-20.1	0.28	0.25	-6.94
4210.0	1.50	279.85	4,209.9	2,946.9	-18.4	5.3	-18.9	0.39	0.34	8.53
4310.0	1.67	283.80	4,309.8	3,046.8	-17.8	2.6	-17.2	0.20	0.17	3.95
4410.0	1.64	287.84	4,409.8	3,146.8	-17.0	-0.2	-15.3	0.12	-0.03	4.04
4510.0	1.77	290.47	4,509.7	3,246.7	-16.0	-3.0	-13.3	0.15	0.13	2.63
4610.0	1.69	296.58	4,609.7	3,346.7	-14.8	-5.7	-11.0	0.20	-0.08	6.11
4710.0	1.71	294.89	4,709.6	3,446.6	-13.5	-8.4	-8.7	0.05	0.02	-1.69
4810.0	1.61	299.82	4,809.6	3,546.6	-12.2	-11.0	-6.4	0.17	-0.10	4.93
4910.0	1.48	299.56	4,909.6	3,646.6	-10.9	-13.3	-4.2	0.13	-0.13	-0.26



Phoenix
Survey Report



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Project:	Doddridge County, WV Grid	MD Reference:	KB @ 1263.0usft
Site:	Doddridge County 512478	North Reference:	Grid
Well:	Well #512478	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	512478 A5 Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,010.0	1.53	299.56	5,009.5	3,746.5	-9.6	-15.6	-2.1	0.05	0.05	0.00
5,110.0	1.40	299.25	5,109.5	3,846.5	-8.3	-17.8	0.0	0.13	-0.13	-0.31
5,210.0	1.43	301.88	5,209.5	3,946.5	-7.1	-20.0	2.0	0.07	0.03	2.63
5,310.0	1.52	297.27	5,309.4	4,046.4	-5.8	-22.2	4.1	0.15	0.09	-4.61
5,410.0	1.40	289.25	5,409.4	4,146.4	-4.8	-24.5	6.0	0.24	-0.12	-8.02

Cyrol Tie In=5472 MD

5,472.0	1.44	283.44	5,471.4	4,208.4	-4.4	-26.0	7.0	0.24	0.06	-9.37
5,502.0	0.70	273.40	5,501.4	4,238.4	-4.3	-26.5	7.4	2.54	-2.47	-33.47
5,534.0	3.70	140.60	5,533.4	4,270.4	-5.0	-26.1	6.5	13.15	9.38	-415.00
5,565.0	8.80	137.00	5,564.2	4,301.2	-7.6	-23.8	3.2	16.49	16.45	-11.61
5,596.0	13.50	135.10	5,594.6	4,331.6	-11.9	-19.7	-2.4	15.21	15.16	-6.13
5,628.0	14.10	134.10	5,625.7	4,362.7	-17.2	-14.2	-9.6	2.02	1.88	-3.13
5,659.0	13.50	134.00	5,655.8	4,392.8	-22.4	-8.9	-16.5	1.94	-1.94	-0.32
5,690.0	13.50	132.00	5,685.9	4,422.9	-27.3	-3.6	-23.2	1.51	0.00	-6.45
5,722.0	14.90	137.10	5,716.9	4,453.9	-32.8	2.0	-30.6	5.86	4.38	15.94
5,753.0	15.30	140.30	5,746.9	4,483.9	-38.9	7.3	-38.3	2.98	1.29	10.32
5,785.0	15.20	139.70	5,777.7	4,514.7	-45.3	12.7	-46.4	0.58	-0.31	-1.88
5,816.0	14.50	140.90	5,807.7	4,544.7	-51.4	17.8	-54.1	2.47	-2.26	3.87
5,847.0	13.60	141.50	5,837.8	4,574.8	-57.3	22.5	-61.4	2.94	-2.90	1.94
5,879.0	11.10	144.50	5,869.0	4,606.0	-62.7	26.6	-68.1	8.06	-7.81	9.38
5,910.0	8.80	147.40	5,899.6	4,636.6	-67.2	29.6	-73.4	7.59	-7.42	9.35
5,942.0	6.30	150.90	5,931.3	4,668.3	-70.8	31.8	-77.6	7.94	-7.81	10.94
5,973.0	4.80	136.30	5,962.1	4,699.1	-73.2	33.5	-80.5	6.61	-4.84	-47.10
6,004.0	4.80	127.80	5,993.0	4,730.0	-74.9	35.4	-82.9	2.29	0.00	-27.42
6,036.0	3.30	120.40	6,024.9	4,761.9	-76.2	37.3	-84.8	4.95	-4.69	-23.13
6,067.0	0.60	119.50	6,055.9	4,792.9	-76.7	38.2	-85.7	8.71	-8.71	-2.90
6,099.0	0.40	236.40	6,087.9	4,824.9	-76.9	38.3	-85.9	2.68	-0.63	365.31
6,130.0	1.60	306.50	6,118.9	4,855.9	-76.7	37.8	-85.5	4.88	3.87	226.13
6,162.0	5.00	318.80	6,150.9	4,887.9	-75.4	36.5	-83.8	10.79	10.63	38.44
6,193.0	8.20	323.70	6,181.6	4,918.6	-72.6	34.4	-80.3	10.47	10.32	15.81
6,225.0	10.60	326.50	6,213.2	4,950.2	-68.3	31.4	-75.1	7.63	7.50	8.75
6,256.0	12.30	331.10	6,243.6	4,980.6	-63.0	28.2	-69.0	6.22	5.48	14.84
6,288.0	12.00	332.00	6,274.9	5,011.9	-57.1	25.0	-62.3	1.11	-0.94	2.81
6,319.0	12.90	330.80	6,305.1	5,042.1	-51.2	21.8	-55.6	3.02	2.90	-3.87
6,351.0	17.00	332.00	6,336.1	5,073.1	-44.0	17.9	-47.4	12.85	12.81	3.75
6,382.0	21.50	330.70	6,365.3	5,102.3	-35.0	12.9	-37.2	14.58	14.52	-4.19
6,414.0	23.90	330.80	6,394.8	5,131.8	-24.2	6.9	-24.9	7.50	7.50	0.31
6,445.0	26.90	330.00	6,422.8	5,159.8	-12.7	0.3	-11.6	9.74	9.68	-2.58
6,476.0	30.10	331.00	6,450.1	5,187.1	0.2	-6.9	3.1	10.44	10.32	3.23
6,508.0	33.10	333.40	6,477.3	5,214.3	15.0	-14.7	19.8	10.16	9.38	7.50
6,540.0	37.20	334.50	6,503.5	5,240.5	31.6	-22.8	38.3	12.96	12.81	3.44
6,571.0	40.30	334.40	6,527.7	5,264.7	49.1	-31.2	57.7	10.00	10.00	-0.32
6,603.0	43.30	335.20	6,551.5	5,288.5	68.4	-40.3	79.0	9.52	9.38	2.50



Phoenix
Survey Report



Database:	LDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 512478
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1263.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB @ 1263.0usft
Site:	Doddridge County 512478	North Reference:	Grid
Well:	Well #512478	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	512478 AA Drilled Surveys		

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,634.0	47.00	333.90	6,573.4	5,310.4	88.2	-49.7	101.0	12.30	11.94	-4.19
6,666.0	51.10	333.20	6,594.3	5,331.3	109.8	-60.5	125.1	12.92	12.81	-2.19
6,697.0	54.20	332.50	6,613.2	5,350.2	131.8	-71.7	149.7	10.16	10.00	-2.26
6,729.0	57.50	331.90	6,631.1	5,368.1	155.2	-84.1	176.2	10.43	10.31	-1.88
6,760.0	60.70	331.40	6,647.0	5,384.0	178.6	-96.7	202.7	10.41	10.32	-1.61
6,792.0	64.00	331.20	6,661.9	5,398.9	203.5	-110.3	231.0	10.33	10.31	-0.63
6,823.0	66.60	332.20	6,674.8	5,411.8	228.3	-123.7	259.1	8.88	8.39	3.23
6,854.0	68.00	332.80	6,686.8	5,423.8	253.6	-136.9	287.7	4.86	4.52	1.94
6,885.0	71.00	333.80	6,697.6	5,434.6	279.6	-149.9	316.7	10.14	9.68	3.23
6,917.0	74.20	335.20	6,707.2	5,444.2	307.1	-163.1	347.3	10.84	10.00	4.38
6,948.0	78.40	336.60	6,714.6	5,451.6	334.6	-175.4	377.4	14.24	13.55	4.52
6,980.0	81.10	338.00	6,720.3	5,457.3	363.7	-187.5	408.8	9.47	8.44	4.38
7,011.0	83.40	338.10	6,724.4	5,461.4	392.1	-199.0	439.5	7.43	7.42	0.32
7,043.0	87.20	337.90	6,727.1	5,464.1	421.7	-210.9	471.3	11.89	11.88	-0.63
LP=7068' MD/ 6728' TVD										
7,068.0	89.70	337.80	6,727.7	5,464.7	444.9	-220.3	496.3	10.01	10.00	-0.40
7,075.0	89.70	337.80	6,727.8	5,464.8	451.3	-223.0	503.3	0.00	0.00	0.00
7,169.0	90.60	337.80	6,727.5	5,464.5	538.4	-258.5	597.2	0.96	0.96	0.00
7,264.0	89.50	335.10	6,727.4	5,464.4	625.4	-296.5	692.1	3.07	-1.16	-2.84
7,358.0	88.20	334.10	6,729.3	5,466.3	710.3	-336.8	786.1	1.74	-1.38	-1.06
7,452.0	89.20	334.90	6,731.5	5,468.5	795.2	-377.2	880.1	1.36	1.06	0.85
7,546.0	88.00	335.70	6,733.8	5,470.8	880.5	-416.5	974.0	1.53	-1.28	0.85
7,641.0	88.10	335.20	6,737.0	5,474.0	966.9	-455.9	1,069.0	0.54	0.11	-0.53
7,735.0	88.80	335.10	6,739.5	5,476.5	1,052.2	-495.4	1,163.0	0.75	0.74	-0.11
7,830.0	89.10	335.00	6,741.3	5,478.3	1,138.3	-535.5	1,257.9	0.33	0.32	-0.11
7,924.0	89.80	334.00	6,742.2	5,479.2	1,223.1	-576.0	1,351.9	1.30	0.74	-1.06
8,018.0	89.40	334.70	6,742.8	5,479.8	1,307.8	-616.7	1,445.9	0.86	-0.43	0.74
8,112.0	86.30	333.70	6,746.4	5,483.4	1,392.4	-657.5	1,539.8	3.46	-3.30	-1.06
8,207.0	88.60	335.70	6,750.6	5,487.6	1,478.2	-698.1	1,634.7	3.21	2.42	2.11
8,302.0	89.50	335.10	6,752.2	5,489.2	1,564.6	-737.6	1,729.7	1.14	0.95	-0.63
8,396.0	90.20	334.80	6,752.4	5,489.4	1,649.7	-777.4	1,823.7	0.81	0.74	-0.32
8,490.0	91.10	334.70	6,751.3	5,488.3	1,734.7	-817.5	1,917.7	0.96	0.96	-0.11
8,584.0	90.30	335.60	6,750.2	5,487.2	1,820.0	-857.0	2,011.7	1.28	-0.85	0.96
8,679.0	89.80	336.40	6,750.1	5,487.1	1,906.8	-895.7	2,106.7	0.99	-0.53	0.84
8,773.0	89.80	335.80	6,750.4	5,487.4	1,992.7	-933.7	2,200.7	0.64	0.00	-0.64
8,867.0	89.20	336.00	6,751.3	5,488.3	2,078.5	-972.1	2,294.6	0.67	-0.64	0.21
8,962.0	90.50	335.50	6,751.5	5,488.5	2,165.2	-1,011.1	2,389.6	1.47	1.37	-0.53
9,056.0	90.00	336.30	6,751.1	5,488.1	2,251.0	-1,049.5	2,483.6	1.00	-0.53	0.85
9,151.0	89.80	333.30	6,751.3	5,488.3	2,336.9	-1,090.0	2,578.6	3.16	-0.21	-3.16
9,246.0	89.80	333.80	6,751.6	5,488.6	2,422.0	-1,132.3	2,673.6	0.53	0.00	0.53
9,341.0	89.30	335.00	6,752.3	5,489.3	2,507.6	-1,173.3	2,768.6	1.37	-0.53	1.26
9,435.0	90.30	334.70	6,752.7	5,489.7	2,592.7	-1,213.3	2,862.6	1.11	1.06	-0.32
Final Survey=9516' MD/ 6754' TVD										



Phoenix
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Doddridge County 512478
Company:	EQT Production - Marcellus	TVD Reference:	KB @ 1263.0usft
Project:	Doddridge County, WV Grid	MD Reference:	KB @ 1263.0usft
Site:	Doddridge County 512478	North Reference:	Grid
Well:	Well #512478	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	512478 A- Drilled Surveys		

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9 515 0	88 30	335.60	6 753 6	5 490 6	2 665 3	-1,246 9	2 942 5	2 74	-2 50	1 13
Projection to TD=9572' MD/ 6755' TVD										
9 572 0	88 30	335 60	6,755 3	5,492 3	2 717 2	-1,270 4	2 999 5	0 00	0 00	0 00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5 472 0	5 471 4	-4 4	-26 0	Gyro Tie In=5472' MD
7,068 0	6,727 7	444 9	-220 3	LP=7068' MD/ 6728' TVD
9,515 0	6,753 6	2 665 3	-1 246 9	Final Survey=9515' MD/ 6754' TVD
9,572 0	6 755 3	2 717 2	-1 270 4	Projection to TD=9572' MD/ 6755' TVD

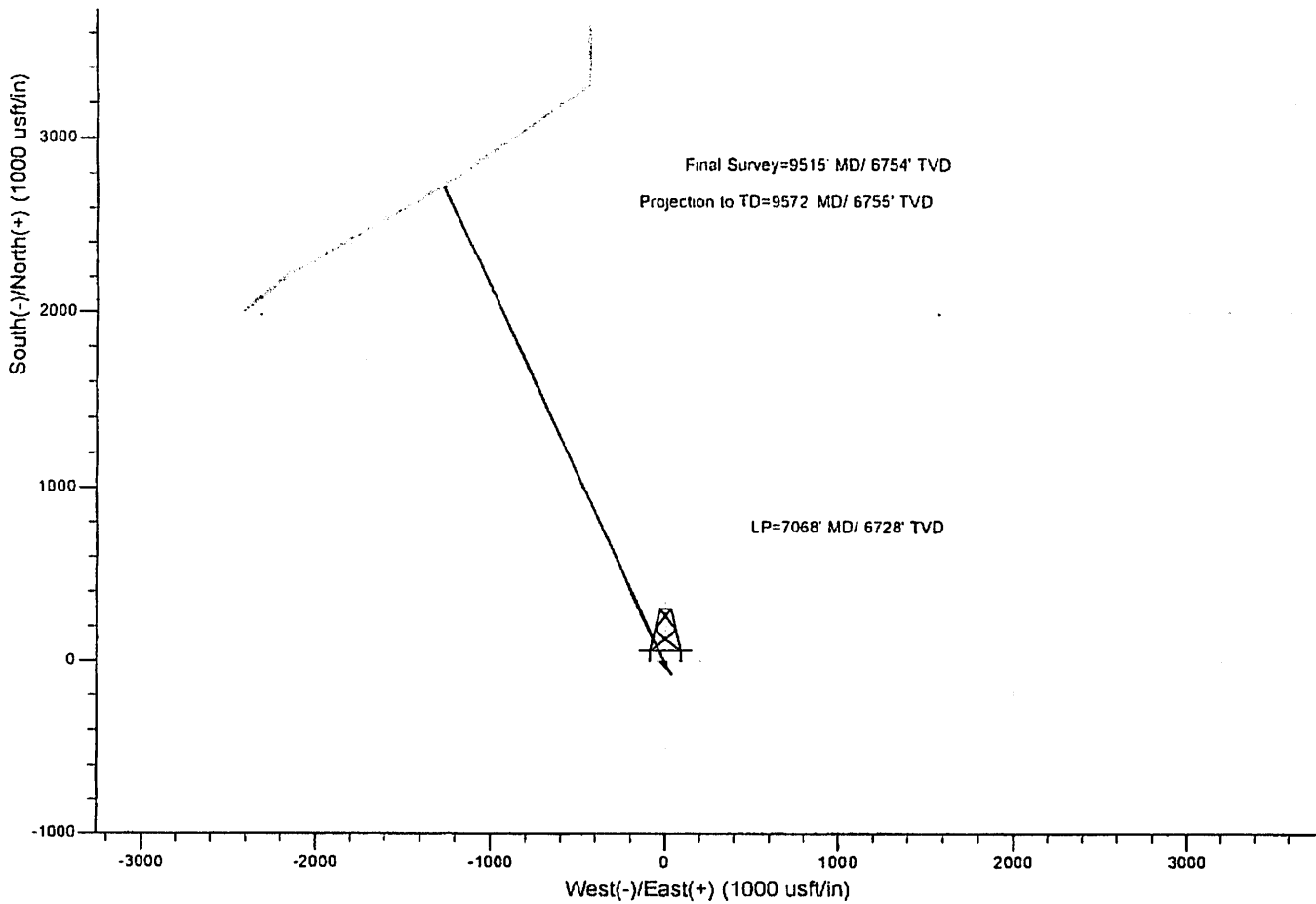
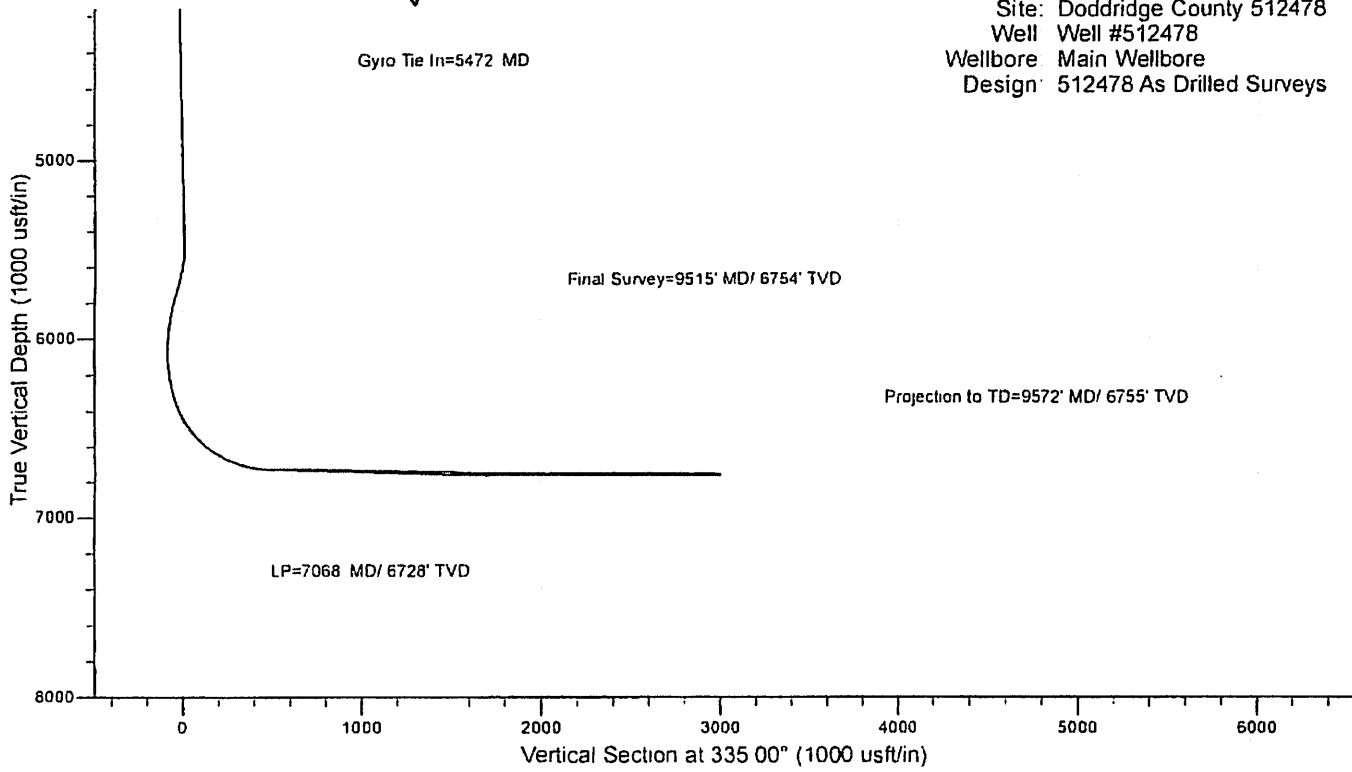
Checked By: _____ Approved By: _____ Date: _____

04/01/2016



EQT Production - Marcellus

Project: Doddridge County, WV Grid
Site: Doddridge County 512478
Well: Well #512478
Wellbore: Main Wellbore
Design: 512478 As Drilled Surveys



512478 47-017-06392-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	1/17/2015	9,565.03	9,566.50	10	MARCELLUS
1	5/9/2015	9,420.00	9,510.00	32	MARCELLUS
2	5/10/2015	9,266.00	9,390.00	40	MARCELLUS
3	5/16/2015	9,124.00	9,242.00	40	MARCELLUS
4	5/16/2015	8,970.00	9,092.00	40	MARCELLUS
5	5/16/2015	8,820.00	8,942.00	40	MARCELLUS
6	5/16/2015	8,668.00	8,788.00	40	MARCELLUS
7	5/17/2015	8,520.00	8,642.00	40	MARCELLUS
8	5/17/2015	8,370.00	8,492.00	40	MARCELLUS
9	5/17/2015	8,220.00	8,342.00	40	MARCELLUS
10	5/17/2015	8,072.00	8,192.00	40	MARCELLUS
11	5/18/2015	7,920.00	8,042.00	40	MARCELLUS
12	5/18/2015	7,770.00	7,892.00	40	MARCELLUS
13	5/18/2015	7,620.00	7,742.00	40	MARCELLUS
14	5/18/2015	7,470.00	7,592.00	40	MARCELLUS
15	5/18/2015	7,320.00	7,442.00	40	MARCELLUS
16	5/18/2015	7,170.00	7,292.00	32	MARCELLUS
17	5/19/2015	7,020.00	7,142.00	40	MARCELLUS
18	5/19/2015	6,870.00	6,992.00	40	MARCELLUS

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	5/9/2015
Job End Date:	5/19/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06392-00-00
Operator Name:	EQT Production
Well Name and Number:	512478
Longitude:	-80.80104600
Latitude:	39.22116200
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,685
Total Base Water Volume (gal):	4,244,100
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	FTS International	Carrier/Base Fluid	Water	7732-18-5	100.00000	97.02063	None
Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100.00000	2.44396	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.06220	None
Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.04711	None
FRW-900	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30.00000	0.02601	None
			Alkyl Alcohol	Proprietary	10.00000	0.00867	None
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00433	None
CS-500 SI	FTS International	Scale inhibitor	Ethylene glycol	107-21-1	10.00000	0.00259	None
HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55.00000	0.00123	None
			Guar gum	9000-30-0	50.00000	0.00112	None
			Surfactant	68439-51-0	2.00000	0.00004	None

			Clay	14808-60-7	2.00000	0.00004	None
FE-100L	FTS International	Iron control					
			Citric acid	77-92-9	55.00000	0.00096	None
CI-150	FTS International	Acid Corrosion Inhibitor					
			Ethylene glycol	107-21-1	30.00000	0.00019	None
			Organic amine resin salt	Proprietary	30.00000	0.00019	None
			Isopropanol	67-63-0	30.00000	0.00019	None
			Aromatic aldehyde	Proprietary	10.00000	0.00006	None
			Dimethylformamide	68-12-2	10.00000	0.00006	None
			Quaternary ammonium compound	Proprietary	10.00000	0.00006	None
NE-100	FTS International	Non-emulsifier					
			2-Propanol	67-63-0	10.00000	0.00004	None
			2-Butoxyethanol	111-76-2	10.00000	0.00004	None
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00002	None
APB-1	FTS International	Breaker					
			Ammonium persulfate	7727-54-0	95.00000	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)

Welcome Michelle N., Operator - OpNo. E1210363 [Log Out]

Hydraulic Fracturing
DISCLOSURE



Submission to FracFocus using Excel Spreadsheets has been turned off.

FIND A WELL BY STATE

ABOUT PROJECT PARTNERS

(Note: Clicking the FracFocus FIND A WELL links will open a new window.)

Prepare Disclosure for FracFocus Submission

[Disclosure Lists](#) | [Dashboard](#)

i Disclosure has been submitted.

Note: This window expires with 10 minutes of inactivity. After that you will be taken back to the dashboard.

Hydraulic Fracturing Data

Job Start Date 5/9/2015	Job End Date 5/19/2015	API Number 47-017-06392-00-00	State & County West Virginia --- Doddridge
Well Name 512478			
Longitude -80.801046	Latitude 39.221162	Datum NAD83	Federal/Tribal Well?
True Vertical Depth (ft) 6685.3	Total Water Vol (gal) 4244100	Total Non Water Vol 0	Total Mass (lbs) 36504621



MSDS Chemical Ingredients

	Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<input type="button" value="Edit"/>	Water	FTS International	Carrier/Base Fluid	Water	7732-18-5	100%	97.0206321021%	None	35417014.5
<input type="button" value="Edit"/>	Sand (Proppant)	FTS International	Proppant	Crystalline Silica	14808-60-7	100%	2.4439590495%	None	892158
<input type="button" value="Edit"/>	MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60%	.0622035339%	None	22707.165
<input type="button" value="Edit"/>	Hydrochloric Acid (15%)	FTS International	Acidizing	Hydrochloric Acid	7647-01-0	15%	.0471105909%	None	17197.543
<input type="button" value="Edit"/>	FRW-900	FTS International	Friction reducer	Hydrotreated light distillate	64742-47-8	30%	.026006426%	None	9493.547
				Alkyl Alcohol	Proprietary	10%	.0086688087%	None	3164.516
				Oxyalkylated alcohol A	Proprietary	5%	.0043344043%	None	1582.258
<input type="button" value="Edit"/>	CS-500-SI	FTS International	Scale inhibitor	Ethylene glycol	107-21-1	10%	.0025913088%	None	945.947
<input type="button" value="Edit"/>	HVG-1	FTS International	Gelling agent	Petroleum distillate	64742-47-8	55%	.0012299601%	None	448.992
				Guar gum	9000-30-0	50%	.0011181456%	None	408.175

<input type="button" value="Edit"/>	FE-100L	FTS International	Iron control	Surfactant	68439-51-0	2%	.0000447258%	None	16.327
				Clay	14808-60-7	2%	.0000447258%	None	16.327
<input type="button" value="Edit"/>	CI-150	FTS International	Acid Corrosion Inhibitor	Citric acid	77-92-9	55%	.000956936%	None	349.326
<input type="button" value="Edit"/>	NE-100	FTS International	Non-emulsifier	Ethylene glycol	107-21-1	30%	.0001901048%	None	69.397
				Organic amine resin salt	Proprietary	30%	.0001901048%	None	69.397
				Isopropanol	67-63-0	30%	.0001901048%	None	69.397
				Aromatic aldehyde	Proprietary	10%	.0000633683%	None	23.132
				Dimethylformamide	68-12-2	10%	.0000633683%	None	23.132
				Quaternary ammonium compound	Proprietary	10%	.0000633683%	None	23.132
<input type="button" value="Edit"/>	APB-1	FTS International	Breaker	Ammonium persulfate	7727-54-0	95%	.0000234217%	None	8.55

Non-MSDS Chemical Ingredients

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
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LEWIS MAXWELL LEASE

2654 ACRES±

WELL NO. WV 512478

LATITUDE 39° 18' 00"
NOTES ON SURVEY

1. TIES TO WELLS, REFERENCES AND CORNERS 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 28 PAGE 177.
3. SURFACE OWNER AND ADJOINER INFORMATION TAKEN FROM THE ASSESSOR AND COUNTY CLERK RECORDS OF DODDRIDGE COUNTY IN JULY, 2013.
4. WELL LAT./LONG. (NAD'27) ESTABLISHED BY DGPS(SURVEY GRADE).
5. PLAT DATED 03/10/10 REVISED 12/26/12 TO EXTEND HORIZONTAL LEG AND CHANGE BOTTOM HOLE COORDINATES, REVISED 06/06/13 TO SHOW NEW TOP HOLE COORDINATES, 08/12/13 TO CONFORM WITH WV CODE R. 35-B, ETC.
6. AS DRILLED INFORMATION PROVIDED BY EQT.

BOTTOM HOLE
WELL NO. WV 512478
STATE PLANE COORDINATES
(NORTH ZONE) NAD'27
N. 268,049.8
E. 1,630,135.9

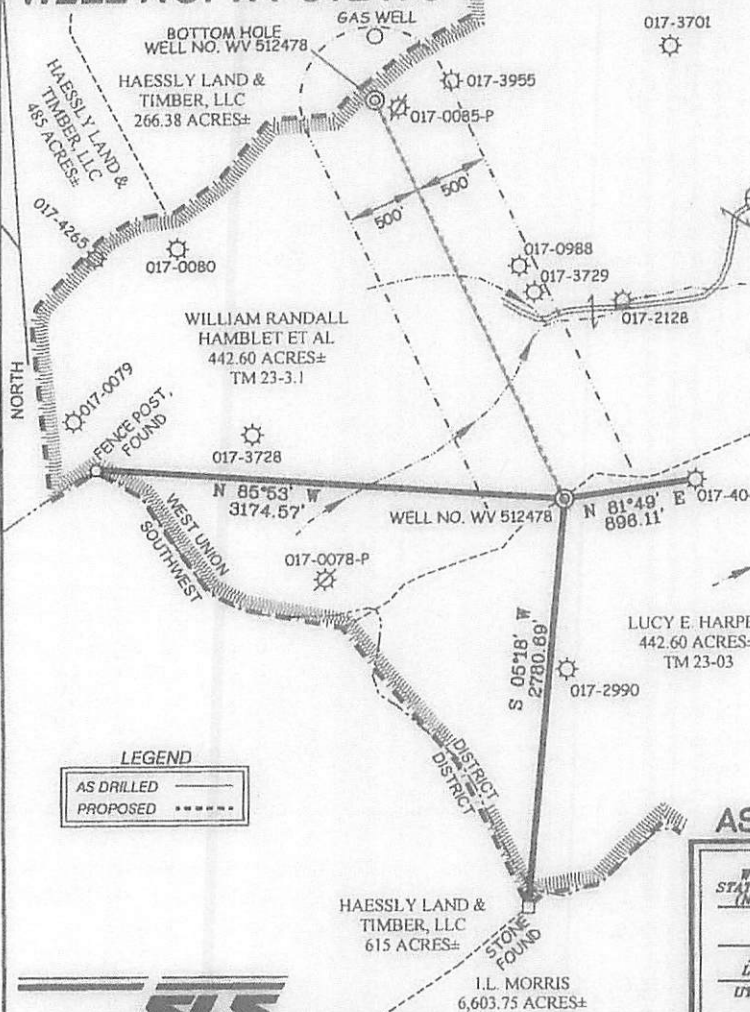
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LONG=(W) 80.805860

UTM (NAD83)(METERS)
N. 4,342,169.7
E. 516,788.8

WELL NO. WV 512478
STATE PLANE COORDINATES
(NORTH ZONE) NAD'27
N. 265,331.0
E. 1,631,403.8

LAT=(N) 39.221162
LONG=(W) 80.801046

UTM (NAD83)(METERS)
N. 4,341,347.9
E. 517,188.9

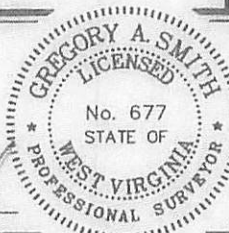


LEGEND
AS DRILLED ———
PROPOSED - - - - -

AS DRILLED INFORMATION

BOTTOM HOLE WELL NO. WV 512478 STATE PLANE COORDINATES (NORTH ZONE) NAD'27	WELL NO. WV 512478 STATE PLANE COORDINATES (NORTH ZONE) NAD'27
N. 268,049.8 E. 1,630,135.4	N. 265,331.0 E. 1,631,403.8
LAT=(N) 39.228571 LONG=(W) 80.805869	LAT=(N) 39.221162 LONG=(W) 80.801046
UTM (NAD83)(METERS) N. 4,342,169.2 E. 516,788.1	UTM (NAD83)(METERS) N. 4,341,347.9 E. 517,188.9

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. *Gregory A. Smith*
677

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE AUGUST 29, 20 13
REVISED DATE NOVEMBER 24, 20 14
OPERATORS WELL NO. WV 512478
API WELL NO. 47
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 6980ASDRILLED512478
SCALE 1" = 1,000'
PROVEN SOURCE OF ELEVATION DGPS (SURVEY GRADE TIE TO CORS NETWORK)

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

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

LOCATION: ELEVATION 1,240' (GROUND) 1,242.5' (PROPOSED) WATERSHED LEFT FORK
DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'

SURFACE OWNER LUCY E. HARPER ACREAGE 442.6±
ROYALTY OWNER LEWIS MAXWELL HEIRS LEASE ACREAGE 2,654±
PROPOSED WORK: LEASE NO. 080616
DRILL CONVERT _____ DRILL DEEPER _____ REDRILL _____ FRACTURE OR STIMULATE PLUG OFF OLD _____
FORMATION _____ PERFORATE NEW FORMATION _____ PLUG AND ABANDON _____ CLEAN OUT AND REPLUG _____ OTHER _____
PHYSICAL CHANGE IN WELL (SPECIFY) _____ TARGET FORMATION MARCELLUS ESTIMATED DEPTH _____

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY
ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330
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04/01/2016