

17-06444



EQT Production

Doddridge County, WV

Orion WEU49 Pad

Well No. 514391

North Reference: Grid

Original Hole

Survey: ProDirectional

Standard Survey Report

15 February, 2015



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Environmental Protection

10/16/2015



17-06444

Professional Directional Survey Report



Company: EQT Production	Local Co-ordinate Reference: Well Well #514391 - Slot 514391
Project: Doddridge County, WV	TVD Reference: GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Site: Orion WEU49 Pad	MD Reference: GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Well: Well #514391	North Reference: Grid
Wellbore: Original Hole	Survey Calculation Method: Minimum Curvature
Design: Original Hole	Database: Well_Planner1

Project Doddridge County, WV	
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 Orion WEU49 Pad		
Site Position:	Northing: 277,569.80 usft	Latitude: 39° 15' 17.748 N
From: Map	Easting: 1,635,662.00 usft	Longitude: 80° 47' 11.892 W
Position Uncertainty: 0.00 usft	Slot Radius: 13-3/16 "	Grid Convergence: -0.82 °

Well Well #514391 - Slot 514391		
Well Position +N/-S 0.00 usft	Northing: 277,510.00 usft	Latitude: 39° 15' 17.158 N
+E/-W 0.00 usft	Easting: 1,635,668.80 usft	Longitude: 80° 47' 11.794 W
Position Uncertainty 0.00 usft	Wellhead Elevation: 1,152.50 usft	Ground Level: 1,130.00 usft

Wellbore Original Hole					
Magnetics	Model Name IGRF2010	Sample Date 2/6/2015	Declination (°) -8.49	Dip Angle (°) 66.72	Field Strength (nT) 52,198

Design Original Hole				
Audit Notes:				
Version: 1.0	Phase: ACTUAL	Tie On Depth: 0.00		
Vertical Section:	Depth From (TVD) (usft) 0.00	+N/-S (usft) 0.00	+E/-W (usft) 0.00	Direction (°) 245.51

Survey Program	Date 2/15/2015			
From (usft) 109.50	To (usft) 5,241.50	Survey (Wellbore) #1 Gyrodata Gyro (Original Hole)	Tool Name Gyrodata_DP_MS	Description Gyrodata gyro-compassing and drop
5,289.00	11,691.00	ProDirectional (Original Hole)	ProMWD	MWD - Standard

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,241.50	1.80	333.42	5,241.00	-13.81	-30.28	33.28	0.00	0.00	0.00
5,289.00	1.99	337.03	5,288.48	-12.38	-30.94	33.29	0.47	0.40	7.60
5,321.00	2.21	325.44	5,320.46	-11.36	-31.50	33.38	1.49	0.69	-36.22
5,352.00	0.88	104.83	5,351.45	-10.93	-31.61	33.30	9.47	-4.29	449.65
5,384.00	4.11	137.14	5,383.42	-11.84	-30.59	32.75	10.62	10.09	100.97
5,416.00	7.11	146.13	5,415.26	-14.32	-28.71	32.06	9.74	9.38	28.09
5,447.00	8.00	139.43	5,445.99	-17.55	-26.24	31.15	4.03	2.87	-21.61
5,479.00	8.62	120.21	5,477.66	-20.45	-22.72	29.15	8.85	1.94	-60.06
5,511.00	10.69	102.85	5,509.21	-22.32	-17.75	25.40	11.09	6.47	-54.25
5,542.00	13.70	93.11	5,539.51	-23.16	-11.28	19.86	11.73	9.71	-31.42

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Professional Directional Survey Report



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Project:	Doddridge County, WV	TVD Reference:	GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Site:	Orion WEU49 Pad	MD Reference:	GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Well:	Well #514391	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Original Hole	Database:	Well_Planner1

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,574.00	16.79	86.24	5,570.39	-23.06	-2.88	12.18	11.17	9.66	-21.47
5,605.00	19.62	80.02	5,599.83	-21.87	6.72	2.95	11.06	9.13	-20.06
5,637.00	22.40	73.33	5,629.71	-19.18	17.85	-8.29	11.46	8.69	-20.91
5,669.00	24.70	67.82	5,659.04	-14.91	29.89	-21.02	9.94	7.19	-17.22
5,700.00	27.40	62.75	5,686.90	-9.20	42.23	-34.62	11.28	8.71	-16.35
5,732.00	30.40	60.15	5,714.91	-1.79	55.80	-50.04	10.16	9.38	-8.13
5,764.00	33.50	57.55	5,742.06	6.98	70.28	-66.85	10.60	9.69	-8.13
5,795.00	36.99	55.92	5,767.37	16.80	85.23	-84.52	11.66	11.26	-5.26
5,827.00	40.08	54.73	5,792.40	28.14	101.62	-104.14	9.93	9.66	-3.72
5,859.00	43.00	53.72	5,816.35	40.55	118.83	-124.95	9.36	9.13	-3.16
5,890.00	46.18	51.12	5,838.43	53.83	136.06	-146.14	11.83	10.26	-8.39
5,954.00	50.99	44.24	5,880.78	86.18	171.43	-191.73	11.01	7.52	-10.75
6,017.00	50.91	44.24	5,920.47	121.23	205.56	-237.32	0.13	-0.13	0.00
6,049.00	50.91	44.24	5,940.65	139.02	222.89	-260.47	0.00	0.00	0.00
6,144.00	48.39	42.35	6,002.15	191.69	272.55	-327.49	3.06	-2.65	-1.99
6,238.00	47.28	43.84	6,065.25	242.57	320.14	-391.90	1.67	-1.18	1.59
6,333.00	46.18	47.63	6,130.38	290.85	369.64	-456.96	3.13	-1.16	3.99
6,428.00	46.00	50.15	6,196.27	335.85	421.20	-522.53	1.92	-0.19	2.65
6,460.00	46.00	50.23	6,218.50	350.58	438.88	-544.73	0.18	0.00	0.25
6,492.00	46.31	52.13	6,240.67	365.05	456.86	-567.09	4.39	0.97	5.94
6,523.00	46.71	57.73	6,262.01	377.96	475.26	-589.18	13.17	1.29	18.06
6,555.00	47.90	63.32	6,283.72	389.51	495.72	-612.60	13.36	3.72	17.47
6,586.00	48.61	68.13	6,304.37	399.01	516.80	-635.71	11.80	2.29	15.52
6,618.00	49.09	71.43	6,325.43	407.33	539.40	-659.73	7.91	1.50	10.31
6,650.00	47.81	75.44	6,346.66	414.17	562.35	-683.45	10.19	-4.00	12.53
6,681.00	47.68	79.32	6,367.51	419.18	584.73	-705.89	9.27	-0.42	12.52
6,713.00	48.21	83.02	6,388.95	422.82	608.20	-728.76	8.74	1.66	11.56
6,745.00	48.52	86.94	6,410.21	424.91	632.02	-751.30	9.21	0.97	12.25
6,776.00	49.32	91.35	6,430.59	425.25	655.37	-772.70	11.03	2.58	14.23
6,808.00	49.40	94.35	6,451.43	424.05	679.62	-794.26	7.12	0.25	9.38
6,840.00	49.18	99.15	6,472.31	421.20	703.69	-814.99	11.39	-0.69	15.00
6,871.00	50.11	103.34	6,492.39	416.59	726.85	-834.15	10.73	3.00	13.52
6,903.00	51.39	106.73	6,512.64	410.16	750.78	-853.26	9.13	4.00	10.59
6,935.00	53.12	111.31	6,532.23	401.90	774.68	-871.59	12.54	5.41	14.31
6,966.00	55.10	115.15	6,550.41	391.99	797.75	-888.47	11.89	6.39	12.39
6,998.00	56.61	118.14	6,568.37	380.11	821.41	-905.08	9.06	4.72	9.34
7,029.00	58.99	121.05	6,584.89	367.15	844.21	-920.46	11.05	7.68	9.39
7,061.00	60.89	124.14	6,600.92	352.23	867.54	-935.50	10.25	5.94	9.66
7,093.00	63.19	127.13	6,615.93	335.76	890.50	-949.56	10.94	7.19	9.34
7,124.00	65.80	131.14	6,629.28	318.10	912.19	-961.98	14.39	8.42	12.94
7,156.00	69.29	133.92	6,641.50	298.11	933.97	-973.51	13.54	10.91	8.69
7,188.00	72.60	136.83	6,651.95	276.58	955.20	-983.91	13.45	10.34	9.09
7,220.00	75.21	139.74	6,660.82	253.63	975.65	-993.01	11.95	8.16	9.09

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Professional Directional

Survey Report



Company:	EQT Production	Local Co-ordinate Reference:	Well Well #514391 - Slot 514391
Project:	Doddridge County, WV	TVD Reference:	GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Site:	Orion WEU49 Pad	MD Reference:	GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Well:	Well #514391	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Original Hole	Database:	Well_Planner1

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,251.00	78.48	142.34	6,667.88	230.16	994.63	-1,000.55	13.34	10.55	8.39
7,283.00	82.90	144.85	6,673.06	204.75	1,013.36	-1,007.06	15.83	13.81	7.84
7,314.00	86.61	146.74	6,675.89	179.22	1,030.71	-1,012.26	13.42	11.97	6.10
7,346.00	87.80	148.42	6,677.45	152.25	1,047.84	-1,016.67	6.43	3.72	5.25
7,378.00	87.72	148.64	6,678.70	124.97	1,064.53	-1,020.56	0.73	-0.25	0.69
7,410.00	88.60	148.73	6,679.73	97.65	1,081.16	-1,024.36	2.76	2.75	0.28
7,417.64	89.32	149.37	6,679.87	91.10	1,085.09	-1,025.22	12.61	9.42	8.39
514391 Plat LP2									
7,441.00	91.52	151.33	6,679.69	70.80	1,096.64	-1,027.32	12.61	9.42	8.39
7,473.00	92.31	152.65	6,678.63	42.56	1,111.66	-1,029.28	4.81	2.47	4.13
7,568.00	93.11	155.42	6,674.13	-42.74	1,153.20	-1,031.72	3.03	0.84	2.92
7,587.10	93.05	155.12	6,673.11	-60.06	1,161.18	-1,031.80	1.60	-0.33	-1.57
514391 Adj LP2									
7,663.00	92.80	153.93	6,669.24	-128.50	1,193.78	-1,033.10	1.60	-0.33	-1.57
7,758.00	92.49	152.65	6,664.85	-213.27	1,236.44	-1,036.77	1.38	-0.33	-1.35
7,853.00	91.91	153.13	6,661.20	-297.77	1,279.70	-1,041.11	0.79	-0.61	0.51
7,948.00	91.52	152.25	6,658.36	-382.14	1,323.26	-1,045.78	1.01	-0.41	-0.93
8,042.00	89.70	151.94	6,657.36	-465.20	1,367.25	-1,051.37	1.96	-1.94	-0.33
8,137.00	90.10	157.45	6,657.53	-551.05	1,407.84	-1,052.72	5.82	0.42	5.80
8,232.00	90.10	157.94	6,657.36	-638.94	1,443.90	-1,049.09	0.52	0.00	0.52
8,327.00	89.88	157.94	6,657.38	-726.99	1,479.58	-1,045.06	0.23	-0.23	0.00
8,422.00	91.52	156.83	6,656.22	-814.67	1,516.10	-1,041.95	2.08	1.73	-1.17
8,517.00	92.62	156.83	6,652.79	-901.95	1,553.46	-1,039.76	1.16	1.16	0.00
8,612.00	92.71	154.94	6,648.37	-988.56	1,592.23	-1,039.14	1.99	0.09	-1.99
8,707.00	90.99	153.04	6,645.30	-1,073.89	1,633.86	-1,041.65	2.70	-1.81	-2.00
8,801.00	90.01	153.75	6,644.48	-1,157.93	1,675.96	-1,045.12	1.29	-1.04	0.76
8,896.00	90.99	151.94	6,643.65	-1,242.45	1,719.31	-1,049.53	2.17	1.03	-1.91
8,991.00	90.50	156.83	6,642.42	-1,328.08	1,760.37	-1,051.39	5.17	-0.52	5.15
9,086.00	88.82	156.35	6,642.98	-1,415.26	1,798.11	-1,049.60	1.84	-1.77	-0.51
9,181.00	89.22	156.44	6,644.60	-1,502.29	1,836.14	-1,048.13	0.43	0.42	0.09
9,276.00	90.10	157.94	6,645.17	-1,589.86	1,872.97	-1,045.34	1.83	0.93	1.58
9,371.00	90.19	157.23	6,644.93	-1,677.68	1,909.19	-1,041.90	0.75	0.09	-0.75
9,466.00	90.41	159.35	6,644.43	-1,765.94	1,944.33	-1,037.29	2.24	0.23	2.23
9,561.00	92.40	153.93	6,642.10	-1,853.09	1,981.97	-1,035.41	6.08	2.09	-5.71
9,656.00	93.11	153.93	6,637.53	-1,938.32	2,023.67	-1,038.02	0.75	0.75	0.00
9,751.00	91.91	152.82	6,633.37	-2,023.16	2,066.21	-1,041.56	1.72	-1.26	-1.17
9,846.00	92.09	152.12	6,630.06	-2,107.36	2,110.09	-1,046.59	0.76	0.19	-0.74
9,941.00	91.30	152.51	6,627.25	-2,191.44	2,154.21	-1,051.88	0.93	-0.83	0.41
10,036.00	91.12	152.34	6,625.24	-2,275.63	2,198.17	-1,056.99	0.26	-0.19	-0.18
10,131.00	89.48	151.63	6,624.74	-2,359.50	2,242.79	-1,062.82	1.88	-1.73	-0.75
10,225.00	88.82	150.93	6,626.14	-2,441.92	2,287.96	-1,069.75	1.02	-0.70	-0.74
10,320.00	89.00	155.73	6,627.95	-2,526.77	2,330.58	-1,073.36	5.06	0.19	5.05
10,415.00	88.91	154.15	6,629.68	-2,612.81	2,370.81	-1,074.31	1.67	-0.09	-1.66
10,510.00	90.41	154.41	6,630.24	-2,698.40	2,412.03	-1,076.34	1.60	1.58	0.27

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Survey Report



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Company:	EQT Production	Local Co-ordinate Reference:	Well Well #514391 - Slot 514391
Project:	Doddridge County, WV	TVD Reference:	GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Site:	Orion WEU49 Pad	MD Reference:	GL 1130 + 22.5' KB @ 1152.50usft (Orion Rig)
Well:	Well #514391	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Original Hole	Database:	Well_Planner1

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,605.00	90.99	156.53	6,629.08	-2,784.81	2,451.47	-1,076.40	2.31	0.61	2.23
10,700.00	91.21	156.04	6,627.26	-2,871.77	2,489.67	-1,075.12	0.57	0.23	-0.52
10,795.00	88.38	157.71	6,627.60	-2,959.13	2,526.98	-1,072.85	3.46	-2.98	1.76
10,890.00	88.82	157.45	6,629.92	-3,046.92	2,563.20	-1,069.42	0.54	0.46	-0.27
10,985.00	88.11	157.45	6,632.46	-3,134.62	2,599.62	-1,066.20	0.75	-0.75	0.00
11,080.00	89.48	154.15	6,634.46	-3,221.24	2,638.54	-1,065.72	3.76	1.44	-3.47
11,175.00	89.79	155.03	6,635.07	-3,307.05	2,679.31	-1,067.24	0.98	0.33	0.93
11,270.00	90.59	155.42	6,634.75	-3,393.30	2,719.12	-1,067.71	0.94	0.84	0.41
11,365.00	91.78	155.91	6,632.79	-3,479.84	2,758.25	-1,067.45	1.35	1.25	0.52
11,460.00	92.31	154.72	6,629.40	-3,566.11	2,797.90	-1,067.77	1.37	0.56	-1.25
11,555.00	93.02	155.51	6,624.98	-3,652.19	2,837.83	-1,068.42	1.12	0.75	0.83
11,631.00	93.20	155.25	6,620.86	-3,721.18	2,869.45	-1,068.59	0.42	0.24	-0.34
Last Survey: 11631.00°MD / 6620.86°TVD									
11,687.31	93.20	155.25	6,617.71	-3,772.24	2,892.99	-1,068.84	0.00	0.00	0.00
514391 Plat TD2									
11,691.00	93.20	155.25	6,617.51	-3,775.58	2,894.53	-1,068.86	0.00	0.00	0.00
PTB: 11691°MD									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,631.00	6,620.86	-3,721.18	2,869.45	Last Survey: 11631.00°MD / 6620.86°TVD
11,691.00	6,617.51	-3,775.58	2,894.53	PTB: 11691°MD

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AZI	TVD	FIN/VS	FL/VV	Dieg	Trace	vsect	target	
0.43	5445.99	-17.55	-26.24	0.00	0.00	4.82		
0.85	5830.88	70.86	119.13	11.00	-98.95	-13.87		1706444
0.85	6249.19	370.97	450.72	0.00	0.00	-145.73		
0.00	6680.00	94.70	1091.34	11.00	100.43	375.39	514391	Plat L
0.00	6530.88	-3775.32	2895.96	0.00	0.00	4645.49	514391	Plat T

FORMATION TOP DETAILS

TVDPPath	MDPath	Formation
6335.00	6616.53	-Sonyea
6489.00	6848.02	-Middlesex
6543.00	6940.96	-Genesee
6624.00	7115.69	-Geneseo
6657.00	7221.91	-Tully

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)