



Phoenix Technology Services
Survey Report



Company:	EQT Production - Marcellus	Local Co-ordinate Reference:	Site Wetzel County 515644
Project:	Wetzel County, WV	TVD Reference:	KB@16 @ 1459.0usft
Site:	Wetzel County 515644	MD Reference:	KB@16 @ 1459.0usft
Well:	Well #515644	North Reference:	Grid
Wellbore:	Main Wellbore	Survey Calculation Method:	Minimum Curvature
Design:	515644 As Drilled Surveys	Database:	EDM 5000 1 Single User Db

Project:	Wetzel 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:	Wetzel County 515644				
Site Position:		Northing:	386,671.28 usft	Latitude:	39° 33' 23.807 N
From:	Map	Easting:	1,695,487.40 usft	Longitude:	80° 34' 48.075 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.69 °

Well:	Well #515644					
Well Position	+N/-S	0.0 usft	Northing:	386,671.28 usft	Latitude:	39° 33' 23.807 N
	+E/-W	0.0 usft	Easting:	1,695,487.40 usft	Longitude:	80° 34' 48.075 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,443.0 usft

Wellbore:	Main Wellbore				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	6/8/2015	-8.35	67.07	52,529

Design:	515644 As Drilled Surveys				
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	147.70	

Survey Program	Date	7/13/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
103.0	4,875.0	Gyrodata Gyro (Main Wellbore)	GYD_DP_MS	Gyrodata gyro-compassing and drop	
4,892.0	14,140.0	515644 PHX MWD (Main Wellbore)	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM	

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
103.0	0.05	91.21	103.0	0.0	0.0	0.0	0.05	0.05	0.00
203.0	0.07	75.60	203.0	0.0	0.1	0.1	0.02	0.02	-15.61
303.0	0.09	82.46	303.0	0.0	0.3	0.1	0.02	0.02	6.86
403.0	0.07	109.87	403.0	0.0	0.4	0.2	0.04	0.04	27.41
503.0	0.08	115.77	503.0	0.0	0.5	0.3	0.01	0.01	
603.0	0.06	105.65	603.0	-0.1	0.7	0.4	0.02	0.02	-10.12
703.0	0.04	69.46	703.0	-0.1	0.7	0.5	0.04	0.04	36.19
803.0	0.05	288.24	803.0	0.0	0.7	0.4	0.04	0.04	-141.22
903.0	0.06	245.14	903.0	-0.1	0.6	0.4	0.04	0.01	-43.10

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WV Department of
Environmental Protection



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MD Reference: KB@16 @ 1459.0usft
North Reference: Gnd
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 i Single User Db

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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)
1,003.0	0.09	249.76	1,003.0	-0.1	0.5	0.4	0.03	0.03	4.62
1,103.0	0.20	306.03	1,103.0	0.0	0.3	0.2	0.17	0.11	56.27
1,203.0	0.24	314.93	1,203.0	0.2	0.0	-0.2	0.05	0.04	8.90
1,303.0	0.24	324.34	1,303.0	0.5	-0.3	-0.6	0.04	0.00	9.41
1,403.0	0.23	329.60	1,403.0	0.9	-0.5	-1.0	0.02	-0.01	5.26
1,503.0	0.35	320.33	1,503.0	1.3	-0.8	-1.5	0.13	0.12	-9.27
1,603.0	0.38	324.14	1,603.0	1.8	-1.2	-2.1	0.04	0.03	3.81
1,703.0	0.39	331.22	1,703.0	2.4	-1.5	-2.8	0.05	0.01	7.08
1,803.0	0.46	350.90	1,803.0	3.1	-1.8	-3.5	0.16	0.07	19.68
1,903.0	0.52	358.94	1,903.0	3.9	-1.8	-4.3	0.09	0.06	8.04
2,003.0	0.72	15.49	2,003.0	5.0	-1.7	-5.1	0.27	0.20	16.55
2,103.0	0.70	13.64	2,103.0	6.2	-1.4	-5.9	0.03	-0.02	-1.85
2,203.0	0.66	3.37	2,203.0	7.3	-1.2	-6.8	0.13	-0.04	-10.27
2,303.0	0.72	358.57	2,303.0	8.5	-1.2	-7.8	0.08	0.06	-4.80
2,403.0	0.78	355.55	2,402.9	9.8	-1.2	-9.0	0.07	0.06	-3.02
2,503.0	0.78	2.45	2,502.9	11.2	-1.2	-10.1	0.09	0.00	6.90
2,603.0	0.85	10.75	2,602.9	12.6	-1.1	-11.2	0.14	0.07	8.30
2,703.0	0.99	12.24	2,702.9	14.2	-0.8	-12.4	0.14	0.14	1.49
2,803.0	1.14	11.25	2,802.9	16.0	-0.4	-13.7	0.15	0.15	-0.99
2,903.0	1.31	3.99	2,902.9	18.1	-0.1	-15.4	0.23	0.17	-7.26
3,003.0	1.29	1.90	3,002.9	20.4	0.0	-17.2	0.05	-0.02	-2.09
3,103.0	1.07	355.67	3,102.8	22.4	0.0	-19.0	0.25	-0.22	-6.23
3,203.0	0.86	340.23	3,202.8	24.1	-0.3	-20.5	0.33	-0.21	-15.44
3,303.0	0.88	338.93	3,302.8	25.5	-0.9	-22.0	0.02	0.00	-1.30
3,403.0	0.78	342.06	3,402.8	26.8	-1.4	-23.4	0.09	-0.08	3.13
3,503.0	0.76	343.63	3,502.8	28.1	-1.7	-24.7	0.03	-0.02	1.57
3,603.0	0.79	344.35	3,602.8	29.4	-2.1	-26.0	0.03	0.03	0.72
3,703.0	0.71	352.04	3,702.8	30.7	-2.4	-27.2	0.13	-0.08	7.69
3,803.0	0.73	340.34	3,802.8	31.9	-2.7	-28.4	0.15	0.02	-11.70
3,903.0	0.68	344.36	3,902.8	33.1	-3.1	-29.6	0.07	-0.05	4.04
4,003.0	0.50	343.79	4,002.7	34.1	-3.3	-30.6	0.18	-0.18	-0.59
4,103.0	0.51	342.42	4,102.7	34.9	-3.6	-31.4	0.02	0.01	-1.37
4,203.0	0.64	332.76	4,202.7	35.8	-4.0	-32.4	0.16	0.13	-9.66
4,303.0	0.62	328.61	4,302.7	36.8	-4.5	-33.5	0.05	-0.02	-4.15
4,403.0	0.65	333.37	4,402.7	37.6	-5.1	-34.6	0.06	0.03	4.76
4,503.0	0.65	326.07	4,502.7	38.7	-5.6	-35.8	0.08	0.00	-7.30
4,603.0	0.67	329.71	4,602.7	39.7	-6.3	-36.9	0.05	0.02	3.64
4,703.0	0.75	336.15	4,702.7	40.8	-6.8	-38.1	0.11	0.08	6.44
4,803.0	0.62	343.67	4,802.7	41.9	-7.2	-39.3	0.16	-0.13	7.52
4,875.0	0.55	348.16	4,874.7	42.7	-7.4	-40.0	0.12	-0.10	6.24
Gyro Tie On=4875' MD									
4,892.0	0.50	322.60	4,891.7	42.8	-7.5	-40.2	1.40	-0.29	-150.35
4,955.0	0.30	350.80	4,954.7	43.2	-7.7	-40.6	0.44	-0.32	44.76



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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)
5,019.0	0.70	340.80	5,018.7	43.7	-7.8	-41.1	0.64	0.63	-15.63
5,082.0	0.60	358.90	5,081.7	44.4	-8.0	-41.8	0.36	-0.16	28.73
5,145.0	0.70	342.80	5,144.7	45.1	-8.1	-42.4	0.33	0.16	-25.56
5,208.0	0.70	357.70	5,207.7	45.8	-8.2	-43.1	0.29	0.00	23.65
5,271.0	0.80	335.50	5,270.7	46.6	-8.4	-43.9	0.48	0.16	-35.24
5,334.0	0.70	324.90	5,333.7	47.3	-8.8	-44.7	0.27	-0.16	-16.83
5,397.0	0.90	344.40	5,396.7	48.1	-9.2	-45.6	0.53	0.32	30.95
5,460.0	0.70	340.10	5,459.7	49.0	-9.4	-46.4	0.33	-0.32	-6.83
5,492.0	0.60	340.60	5,491.7	49.3	-9.5	-46.8	0.31	-0.31	1.56
5,524.0	2.00	42.00	5,523.6	49.9	-9.2	-47.1	5.60	4.38	191.88
5,555.0	5.40	61.20	5,554.6	51.0	-7.6	-47.2	11.52	10.97	61.94
5,587.0	8.70	62.70	5,586.3	52.8	-4.1	-46.9	10.33	10.31	4.69
5,618.0	11.80	67.90	5,616.8	55.1	0.9	-46.1	10.43	10.00	16.77
5,650.0	14.20	70.20	5,648.0	57.7	7.6	-44.7	7.67	7.50	7.19
5,682.0	17.30	74.30	5,678.8	60.3	15.9	-42.5	10.29	9.69	12.81
5,713.0	20.10	77.30	5,708.2	62.7	25.5	-39.4	9.55	9.03	9.68
5,745.0	23.00	78.40	5,737.9	65.2	37.0	-35.3	9.15	9.06	3.44
5,777.0	25.40	78.60	5,767.1	67.8	49.9	-30.6	7.50	7.50	0.63
5,808.0	28.00	78.10	5,794.8	70.6	63.5	-25.7	8.42	8.39	-1.61
5,839.0	30.40	79.10	5,821.9	73.6	78.4	-20.3	7.90	7.74	3.23
5,871.0	32.00	79.00	5,849.2	76.7	94.6	-14.3	5.00	5.00	-0.31
5,902.0	34.60	81.10	5,875.1	79.7	111.4	-7.8	9.17	8.39	6.77
5,934.0	37.30	82.80	5,901.0	82.3	130.0	-0.1	8.99	8.44	5.31
5,965.0	39.40	84.10	5,925.4	84.5	149.1	8.3	7.26	6.77	4.19
5,997.0	40.60	82.40	5,949.9	86.9	169.5	17.1	5.07	3.75	-5.31
6,028.0	39.80	81.60	5,973.5	89.7	189.3	25.4	3.07	-2.58	-2.58
6,092.0	41.80	80.20	6,022.0	96.3	230.6	41.8	3.44	3.13	-2.19
6,155.0	39.30	78.40	6,069.9	103.9	270.9	58.9	4.38	-3.97	-2.86
6,218.0	37.90	78.90	6,119.1	111.6	309.4	71.0	2.28	-2.22	0.79
6,281.0	38.60	81.30	6,168.6	118.3	347.8	85.8	2.61	1.11	3.81
6,344.0	39.90	83.20	6,217.4	123.7	387.3	102.4	2.81	2.06	3.02
6,407.0	41.10	83.70	6,265.3	128.3	428.0	120.2	1.97	1.90	0.79
6,470.0	42.80	81.70	6,312.1	133.7	469.7	137.9	3.43	2.70	-3.17
6,533.0	43.70	80.80	6,358.0	140.3	512.4	155.2	1.73	1.43	-1.43
6,596.0	42.20	80.10	6,404.1	147.4	554.7	171.8	2.50	-2.38	-1.11
6,659.0	39.50	78.30	6,451.8	155.1	595.2	186.9	4.68	-4.29	-2.86
6,722.0	38.40	79.00	6,500.8	162.9	634.0	201.1	1.88	-1.75	1.11
6,785.0	42.50	80.80	6,548.7	170.0	674.2	216.5	6.77	6.51	2.86
6,848.0	44.00	80.10	6,594.6	177.2	716.8	233.2	2.50	2.38	-1.11
6,911.0	42.30	78.10	6,640.5	185.3	759.1	248.9	3.46	-2.70	-3.17
6,974.0	41.60	79.70	6,687.4	193.4	800.4	264.2	2.03	-1.11	2.54
7,037.0	42.30	82.10	6,734.3	200.1	842.0	280.7	2.78	1.11	3.81
7,100.0	40.30	79.60	6,781.6	206.7	883.1	297.1	4.12	-3.17	-3.97



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7,163.0	40.10	79.30	6,829.7	214.1	923.0	312.2	0.44	-0.32	-0.48	
7,226.0	41.80	79.40	6,877.3	221.8	963.6	327.4	2.70	2.70	0.16	
7,289.0	42.50	78.80	6,924.0	229.8	1,005.1	342.8	1.28	1.11	-0.95	
7,352.0	44.90	81.20	6,969.5	237.3	1,048.0	359.3	4.63	3.81	3.81	
7,415.0	43.60	79.50	7,014.7	244.7	1,091.3	376.3	2.79	-2.06	-2.70	
7,478.0	42.00	79.30	7,060.9	252.5	1,133.4	392.1	2.55	-2.54	-0.32	
7,542.0	42.70	79.30	7,108.2	260.5	1,175.8	408.0	1.09	1.09	0.00	
7,605.0	42.30	79.30	7,154.6	268.4	1,217.6	423.6	0.63	-0.63	0.00	
7,668.0	40.60	78.70	7,201.9	276.4	1,258.5	438.8	2.77	-2.70	-0.95	
7,699.0	40.60	84.50	7,225.4	279.3	1,278.5	447.0	12.17	0.00	18.71	
7,731.0	40.90	89.80	7,249.7	280.4	1,299.3	457.2	10.85	0.94	16.56	
7,762.0	40.60	95.80	7,273.2	279.4	1,319.5	468.8	12.67	-0.97	19.35	
7,794.0	40.80	100.30	7,297.4	276.5	1,340.1	482.3	9.19	0.63	14.06	
7,826.0	41.80	102.70	7,321.5	272.3	1,360.8	497.0	5.85	3.13	7.50	
7,857.0	44.30	102.60	7,344.1	267.6	1,381.5	511.9	8.07	8.06	-0.32	
7,889.0	46.70	103.80	7,366.5	262.4	1,403.7	528.2	7.96	7.50	3.75	
7,920.0	47.90	107.40	7,387.6	256.3	1,425.6	545.1	9.37	3.87	11.61	
7,952.0	49.00	109.80	7,408.8	248.6	1,448.3	563.7	6.58	3.44	7.50	
7,983.0	50.10	114.90	7,428.9	239.7	1,470.1	582.9	13.01	3.55	16.45	
8,015.0	51.60	119.70	7,449.1	228.3	1,492.2	604.3	12.54	4.69	15.00	
8,046.0	54.40	123.10	7,467.8	215.4	1,513.3	626.5	12.58	9.03	10.97	
8,078.0	56.50	126.50	7,485.9	200.3	1,534.9	650.8	10.94	6.56	10.63	
8,109.0	59.30	128.40	7,502.4	184.4	1,555.8	675.4	10.42	9.03	6.13	
8,141.0	62.40	129.60	7,518.0	166.8	1,577.5	701.9	10.23	9.69	3.75	
8,172.0	64.30	131.20	7,531.9	148.8	1,598.6	728.3	7.67	6.13	5.16	
8,204.0	66.00	133.90	7,545.3	129.2	1,619.9	756.3	9.32	5.31	8.44	
8,236.0	67.50	137.60	7,558.0	108.1	1,640.5	785.1	11.61	4.69	11.56	
8,267.0	70.70	140.30	7,569.0	86.3	1,659.5	813.7	13.14	10.32	8.71	
8,299.0	74.30	142.50	7,578.7	62.4	1,678.5	844.0	13.02	11.25	6.88	
8,330.0	77.70	144.90	7,586.2	38.2	1,696.3	874.0	13.29	10.97	7.74	
8,362.0	80.60	148.20	7,592.2	12.0	1,713.6	905.5	13.59	9.06	10.31	
8,393.0	82.20	150.50	7,596.8	-14.4	1,729.2	936.1	8.97	5.16	7.42	
8,424.0	83.90	153.10	7,600.6	-41.5	1,743.8	966.8	9.97	5.48	8.39	
8,456.0	84.80	155.50	7,603.7	-70.2	1,757.6	998.4	7.98	2.81	7.50	
8,487.0	85.20	157.80	7,606.4	-98.6	1,769.8	1,028.9	7.50	1.29	7.42	
8,518.0	85.80	160.40	7,608.9	-127.4	1,780.8	1,059.2	8.58	1.94	8.39	
8,538.8	86.06	161.70	7,610.3	-147.1	1,787.6	1,079.4	6.36	1.25	6.25	
515644 LP1072' VS										
8,550.0	86.20	162.40	7,611.1	-157.7	1,791.0	1,090.2	6.36	1.25	6.25	
8,582.0	86.10	162.80	7,613.2	-188.1	1,800.6	1,121.1	1.29	-0.31	1.25	
8,613.0	86.30	162.30	7,615.3	-217.7	1,809.8	1,151.0	1.73	0.65	-1.61	
8,645.0	86.50	163.60	7,617.3	-248.2	1,819.2	1,181.8	4.10	0.63	4.06	
8,676.0	86.90	164.80	7,619.1	-278.0	1,827.6	1,211.5	4.07	1.29	3.87	
8,739.0	88.00	164.20	7,621.9	-338.6	1,844.5	1,271.7	1.99	1.75	-0.95	



Phoenix Technology Services
Survey Report



Company: EQT Production - Marcellus
Project: Wetzel County, WV
Site: Wetzel County 515644
Well: Well #515644
Wellbore: Main Wellbore
Design: 515644 As Drilled Surveys

Local Co-ordinate Reference: Site Wetzel County 515644
TVD Reference: KB@16 @ 1459 0usft
MD Reference: KB@16 @ 1459 0usft
North Reference: Gnd
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 1 Single User Db

Survey

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)
LP=8739' MD/7622' TVD									
8,802.0	90.50	164.60	7,622.7	-399.3	1,861.4	1,332.1	4.02	3.97	0.63
8,866.0	90.70	164.60	7,622.0	-461.0	1,878.4	1,393.3	0.31	0.31	0.00
8,929.0	89.80	163.00	7,621.8	-521.5	1,896.0	1,453.8	2.91	-1.43	-2.54
8,992.0	88.60	162.20	7,622.6	-581.6	1,914.8	1,514.7	2.29	-1.90	-1.27
9,055.0	88.60	163.00	7,624.2	-641.7	1,933.6	1,575.6	1.27	0.00	1.27
9,118.0	89.10	163.60	7,625.5	-702.0	1,951.7	1,636.2	1.24	0.79	0.95
9,179.8	90.28	166.45	7,625.8	-761.7	1,967.7	1,695.2	4.98	1.90	4.60
515644 Plat LP									
9,181.0	90.30	166.50	7,625.8	-762.9	1,968.0	1,696.3	4.98	1.90	4.60
9,244.0	90.30	166.80	7,625.5	-824.2	1,982.5	1,755.9	0.48	0.00	0.48
9,307.0	89.70	165.00	7,625.5	-885.3	1,997.9	1,815.8	3.01	-0.95	-2.86
9,370.0	88.70	162.10	7,626.3	-945.7	2,015.7	1,876.4	4.87	-1.59	-4.60
9,433.0	88.20	162.00	7,626.0	-1,005.6	2,035.1	1,937.4	0.81	-0.79	-0.16
9,496.0	88.10	162.10	7,630.1	-1,065.5	2,054.5	1,998.4	0.22	-0.16	0.16
9,559.0	88.20	161.80	7,632.1	-1,125.4	2,074.0	2,059.4	0.50	0.16	-0.48
9,622.0	87.90	160.60	7,634.2	-1,185.0	2,094.3	2,120.6	1.96	-0.48	-1.90
9,685.0	88.60	160.60	7,636.2	-1,244.4	2,115.2	2,182.0	1.11	1.11	0.00
9,748.0	90.70	160.70	7,636.6	-1,303.8	2,136.1	2,243.4	3.34	3.33	0.16
9,812.0	91.20	161.10	7,635.5	-1,364.3	2,157.1	2,305.7	1.00	0.78	0.63
9,875.0	91.10	160.80	7,634.2	-1,423.8	2,177.6	2,367.0	0.50	-0.16	-0.48
9,938.0	92.20	162.00	7,632.4	-1,483.5	2,197.7	2,428.2	2.58	1.75	1.90
10,001.0	92.40	162.80	7,629.9	-1,543.5	2,216.7	2,489.1	1.31	0.32	1.27
10,064.0	92.50	162.80	7,627.2	-1,603.6	2,235.3	2,549.9	0.16	0.16	0.00
10,127.0	90.70	162.50	7,625.4	-1,663.7	2,254.1	2,610.7	2.90	-2.86	-0.48
10,190.0	88.40	159.90	7,625.9	-1,723.4	2,274.4	2,672.0	5.51	-3.65	-4.13
10,253.0	87.20	158.80	7,628.3	-1,782.3	2,296.6	2,733.6	2.58	-1.90	-1.75
10,316.0	88.80	160.50	7,630.5	-1,841.3	2,318.5	2,795.2	3.70	2.54	2.70
10,379.0	90.70	163.00	7,630.8	-1,901.1	2,338.2	2,856.3	4.98	3.02	3.97
10,442.0	91.00	162.60	7,629.9	-1,961.3	2,356.9	2,917.1	0.79	0.48	-0.63
10,506.0	89.10	160.90	7,629.8	-2,022.1	2,376.9	2,979.2	3.98	-2.97	-2.66
10,568.0	88.90	162.10	7,630.9	-2,080.8	2,396.6	3,039.4	1.96	-0.32	1.94
10,631.0	88.50	162.60	7,632.3	-2,140.9	2,415.7	3,100.4	1.02	-0.63	0.79
10,694.0	89.80	165.30	7,633.3	-2,201.4	2,433.1	3,160.8	4.76	2.06	4.29
10,757.0	90.30	166.50	7,633.2	-2,262.5	2,448.4	3,220.7	2.06	0.79	1.90
10,820.0	88.40	162.00	7,633.9	-2,323.1	2,465.5	3,281.0	7.75	-0.02	7.14
10,883.0	88.40	161.50	7,635.7	-2,382.9	2,485.3	3,342.1	0.79	0.63	-0.79
10,946.0	88.80	162.70	7,637.2	-2,442.8	2,504.6	3,403.1	3.18	-0.16	1.90
11,009.0	88.70	160.70	7,636.6	-2,502.6	2,524.4	3,464.3	1.57	-0.16	-3.17
11,073.0	88.80	161.70	7,640.0	-2,563.2	2,545.0	3,526.5	1.92	0.79	1.56
11,136.0	89.30	162.80	7,641.1	-2,623.2	2,564.2	3,587.4	2.34	0.79	1.75
11,199.0	90.00	164.10	7,641.4	-2,683.6	2,582.2	3,648.1	2.68	0.79	1.90
11,262.0	89.10	162.90	7,641.9	-2,744.0	2,600.1	3,708.7	0.99	-0.63	-1.90
11,325.0	88.70	162.50	7,643.1	-2,804.1	2,618.8	3,769.5	0.99	-0.63	-0.63

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Survey Calculation Method:
Database:

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Gnd
Minimum Curvature
EDM 5000 1 Single User Db

Survey

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)
11,388.0	88.70	162.80	7,644.6	-2,864.3	2,637.6	3,830.4	0.48	0.00	0.48
11,451.0	88.00	161.70	7,646.4	-2,924.2	2,656.8	3,891.3	2.07	-1.11	-1.75
11,514.0	87.70	160.70	7,648.7	-2,983.8	2,677.0	3,952.6	1.66	-0.48	-1.59
11,577.0	89.20	161.90	7,650.5	-3,043.5	2,697.2	4,013.8	3.05	2.38	1.90
11,640.0	90.20	163.40	7,650.8	-3,103.6	2,716.0	4,074.6	2.86	1.59	2.38
11,703.0	90.50	164.30	7,650.4	-3,164.1	2,733.5	4,135.1	1.51	0.48	1.43
11,766.0	89.10	162.90	7,650.6	-3,224.5	2,751.3	4,195.7	3.14	-2.22	-2.22
11,829.0	88.10	161.50	7,652.2	-3,284.5	2,770.6	4,256.7	2.73	-1.59	-2.22
11,893.0	88.40	161.70	7,654.1	-3,345.2	2,790.8	4,318.8	0.56	0.47	0.31
11,956.0	87.60	160.70	7,656.3	-3,404.8	2,811.1	4,380.0	2.03	-1.27	-1.59
12,019.0	88.10	160.80	7,658.7	-3,464.2	2,831.8	4,441.4	0.81	0.79	0.16
12,082.0	89.40	162.10	7,660.0	-3,524.0	2,851.9	4,502.5	2.92	2.06	2.06
12,145.0	89.30	161.90	7,660.8	-3,583.9	2,871.3	4,563.6	0.35	-0.16	-0.32
12,209.0	89.80	161.40	7,661.3	-3,644.6	2,891.5	4,625.7	1.10	0.78	-0.78
12,272.0	90.10	161.40	7,661.3	-3,704.3	2,911.6	4,686.9	0.48	0.48	0.00
12,335.0	89.90	161.20	7,661.3	-3,764.0	2,931.8	4,748.1	0.45	-0.32	-0.32
12,398.0	90.40	160.80	7,661.2	-3,823.6	2,952.3	4,809.4	1.02	0.79	-0.63
12,461.0	90.00	158.80	7,660.9	-3,882.7	2,974.0	4,871.0	3.24	-0.63	-3.17
12,524.0	91.30	160.90	7,660.2	-3,941.8	2,995.7	4,932.6	3.92	2.06	3.33
12,586.0	91.60	161.80	7,658.7	-4,000.5	3,015.6	4,992.9	1.53	0.48	1.45
12,649.0	90.80	161.70	7,657.4	-4,060.4	3,035.3	5,054.0	1.60	-1.59	-0.16
12,712.0	91.00	163.40	7,656.6	-4,120.5	3,054.2	5,114.8	2.77	0.63	2.70
12,775.0	89.20	160.60	7,656.5	-4,180.4	3,073.6	5,175.9	5.28	-2.86	-4.44
12,838.0	88.60	160.50	7,657.7	-4,239.8	3,094.6	5,237.3	0.97	-0.95	-0.16
12,901.0	89.50	161.90	7,658.7	-4,299.4	3,114.9	5,298.5	2.64	1.43	2.22
12,964.0	89.00	162.30	7,659.5	-4,359.3	3,134.3	5,359.6	1.02	-0.79	0.63
13,027.0	89.20	164.30	7,660.5	-4,419.7	3,152.4	5,420.2	3.19	0.32	3.17
13,090.0	90.00	166.40	7,661.0	-4,480.6	3,168.3	5,480.3	3.57	1.27	3.33
13,153.0	90.60	165.70	7,660.6	-4,541.8	3,183.5	5,540.1	1.46	0.95	-1.11
13,216.0	89.60	163.00	7,660.5	-4,602.4	3,200.5	5,600.4	4.57	-1.59	-4.29
13,279.0	89.10	161.40	7,661.2	-4,662.4	3,219.7	5,661.4	2.66	-0.79	-2.54
13,342.0	88.20	158.30	7,662.7	-4,721.5	3,241.4	5,723.0	5.12	-1.43	-4.92
13,406.0	89.20	161.20	7,664.2	-4,781.5	3,263.6	5,785.5	4.79	1.56	4.53
13,469.0	90.10	163.70	7,664.6	-4,841.6	3,282.6	5,846.4	4.22	1.43	3.97
13,532.0	90.50	165.40	7,664.2	-4,902.3	3,299.3	5,906.7	2.77	0.79	2.70
13,595.0	89.50	162.00	7,664.2	-4,962.8	3,317.0	5,967.3	5.63	0.79	-5.40
13,658.0	89.70	161.30	7,664.7	-5,022.6	3,336.9	6,028.4	2.21	0.32	-1.11
13,721.0	90.20	160.00	7,664.7	-5,082.0	3,357.7	6,089.8	0.66	0.79	-2.06
13,785.0	90.50	159.70	7,664.3	-5,142.1	3,379.8	6,152.4	1.72	0.47	-0.47
13,848.0	89.90	158.80	7,664.1	-5,201.0	3,402.1	6,214.1	1.72	-0.95	-1.43
13,911.0	89.40	159.20	7,664.5	-5,259.8	3,424.7	6,275.9	4.76	0.79	-3.81
13,974.0	87.60	156.80	7,666.1	-5,318.2	3,448.3	6,337.9	3.66	0.79	-3.81
14,037.0	86.90	158.80	7,669.2	-5,378.5	3,472.0	6,399.8	3.66	-1.11	3.17

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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)
14,081.0	86.70	158.20	7,671.6	-5,417.3	3,488.1	6,443.0	1.44	-0.45	-1.36
Final Survey=14081' MD/7672' TVD									
14,140.0	86.70	158.20	7,675.0	-5,472.0	3,510.0	6,500.9	0.00	0.00	0.00
PROJ to Bit/Deepest Point=14140' MD/7675' TVD - 515644 Plat TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,875.0	4,874.7	42.7	-7.4	Gyro Tie On=4875' MD
8,739.0	7,621.9	-338.6	1,844.5	LP=8739' MD/7622' TVD
14,081.0	7,671.6	-5,417.3	3,488.1	Final Survey=14081' MD/7672' TVD
14,140.0	7,675.0	-5,472.0	3,510.0	PROJ to Bit/Deepest Point=14140' MD/7675' TVD

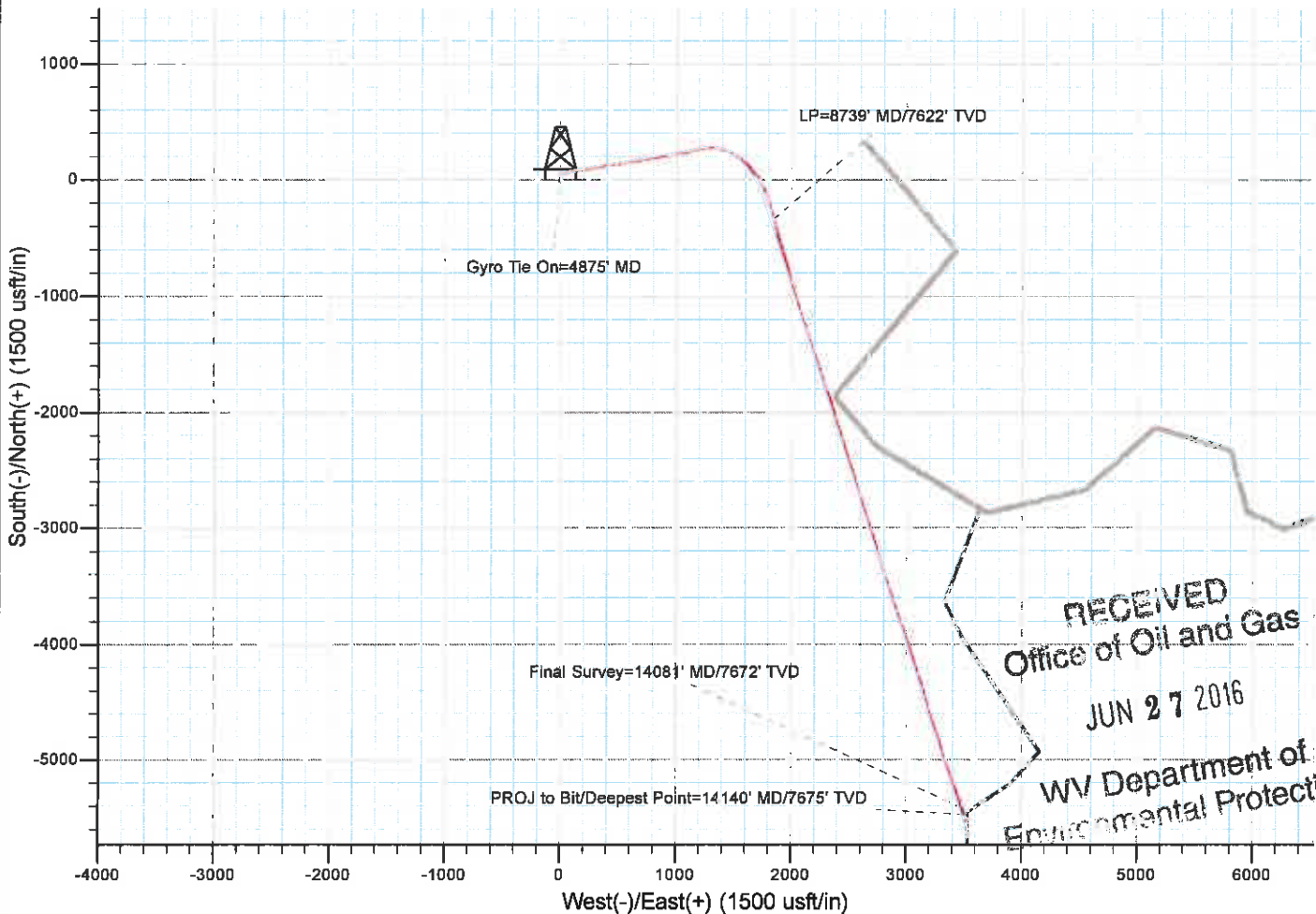
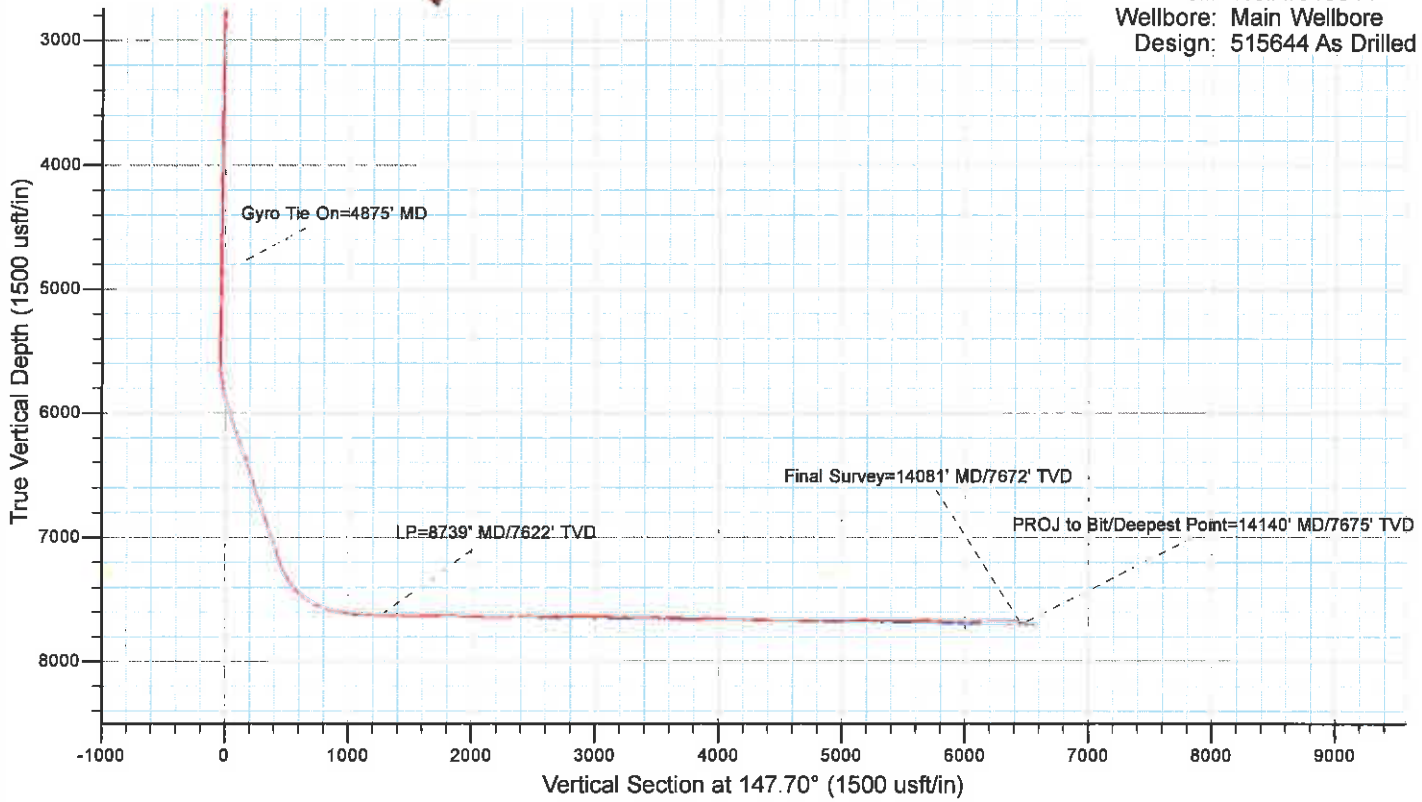
Checked By: _____ Approved By: _____ Date: _____

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