

Quality Natural Gas, LLC

PO Box 480
Allen, KY 41601
(606)874-8041 ext. 233

April 25, 2017

Oil & Gas Conservation Commission
601 57th Street
Charleston, WV 25304

RE: Completion Report
Quality Natural Gas, LLC

RECEIVED
Office of Oil and Gas
APR 28 2017
WV Department of
Environmental Protection

To Whom It May Concern:

Please find enclosed a copy of the completion report (Form WR-35), the log, the directional survey and the packer placement report for the below listed well:

Mingo County Well #2403 (API# 47-059-2260)


Should you need any additional information or have any questions, please feel free to contact me at the above number.

Sincerely,



Janice Wright

APPROVED

NAME: 
DATE: 5-10-2017 05/26/2017

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

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APR 20 2017
WV Department of
Environmental Protection

API 47 - 059 - 2260 County MINGO District MAGNOLIA
Quad MAJESTIC Pad Name _____ Field/Pool Name _____
Farm name LOGAN COAL & TIMBER, C.W. CAMPBELL & JLCCLCT Well Number 2403
Operator (as registered with the OOG) QUALITY NATURAL GAS, LLC
Address P.O. BOX 480 City ALLEN State KY Zip 41601

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing _____ Easting _____
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing _____ Easting _____

Elevation (ft) 1176.93 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)
N/A

Date permit issued 09/10/2015 Date drilling commenced 11/16/2016 Date drilling ceased 12/02/2016
Date completion activities began 1/04/2017 Date completion activities ceased 1/05/2017
Verbal plugging (Y/N) N/A Date permission granted _____ Granted by _____

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

Freshwater depth(s) ft None Encountered Open mine(s) (Y/N) depths N
Salt water depth(s) ft None Encountered Void(s) encountered (Y/N) depths N
Coal depth(s) ft None Encountered Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:
05/26/2017

API 47- 059 - 2260 Farm name LOGAN COAL & TIMBER, C.W. CAMPBELL & JLCLCT Well number 2403

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	Packers	9013	8773	Packer port @ 8816'	Devonian Shale
2	Ran	8773	8592	Packer port @ 8683'	Devonian Shale
3	12/13/2016	8592	8369	Packer port @ 8501'	Devonian Shale
4		8369	8104	Packer port @8236'	Devonian Shale
5		8104	7922	Packer port @8013'	Devonian Shale
6		7922	7741	Packer port @7832'	Devonian Shale
7		7741	7560	Packer port @7650'	Devonian Shale
8		7560	7295	Packer port @7427'	Devonian Shale
9		7295	7113	Packer port @7204'	Devonian Shale
10		7113	6932	Packer port @7023'	Devonian Shale
11		6932	6750	Packer port @6841'	Devonian Shale
12		6750	6527	Packer port @6660'	Devonian Shale
13		6527	6144		Not treated
14		6144	5921	Packer port @6011'	Devonian Shale
15		5921	5697	Packer port @5830'	Devonian Shale
16		5697	5433	Packer port @5565'	Devonian Shale

Please insert additional pages as applicable. *Additional page attached*

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STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

WV Department
Environmental Protection

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)
1	1/4/17	98,000 cfm	5496	5103	3351	None		1155 mcf
2	1/4/17	91,600 cfm	5658	6060	4058	None		1005 mcf
3	1/4/17	97,600 cfm	5598	5615	3830	None		1007 mcf
4	1/4/17	98,400 cfm	5779	5010	4034	None		1003 mcf
5	1/4/17	102,600 cfm	5998	5459	3936	None		1008 mcf
6	1/4/17	102,900 cfm	5090	5229	3184	None		1001 mcf
7	1/4/17	101,800 cfm	4476	3813	2950	None		1001 mcf
8	1/4/17	101,400 cfm	4241	4053	2891	None		1001 mcf
9	1/4/17	103,000 cfm	4241	4072	2168	None		1002 mcf
10	1/5/17	107,000 cfm	4401	4081	2989	None		1000 mcf
11	1/5/17	105,800 cfm	4130	4106	2617	None		1004 mcf
12	1/5/17	103,600 cfm	4096	3618	2490	None		1002 mcf
13	1/5/17	106,500 cfm	4053	3628	2686	None		1002 mcf
14	1/5/17	113,100 cfm	4282	3726	3481	None		1001 mcf
15	1/5/17	105,800 cfm	4429	3838	3184	None		1002 mcf
16	1/5/17	103,500 cfm	3956	3540	2954	None		1001 mcf

Please insert additional pages as applicable. *Additional page attached*

05/26/2017

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
4207.00	23.30	324.00	4197.78	58.09	-21.52	58.90	61.95	339.68	8.89
4239.00	25.10	322.90	4226.97	68.62	-29.33	72.01	74.63	336.86	5.80
4270.00	26.60	321.40	4254.87	79.29	-37.63	85.52	87.77	334.61	5.28
4302.00	28.80	321.10	4283.20	90.89	-46.94	100.39	102.30	332.69	6.89
4333.00	31.00	320.50	4310.07	102.86	-56.71	115.84	117.46	331.13	7.16
4364.00	33.40	321.20	4336.30	115.68	-67.13	132.36	133.75	329.87	7.83
4396.00	35.80	321.20	4362.64	129.84	-78.52	150.53	151.73	328.84	7.50
4427.00	37.80	320.60	4387.46	144.25	-90.23	169.10	170.14	327.97	6.55
4459.00	40.00	319.80	4412.36	159.68	-103.09	189.18	190.07	327.15	7.05
4490.00	42.10	317.80	4435.74	174.99	-116.51	209.51	210.23	326.34	7.99
4522.00	44.40	318.40	4459.05	191.31	-131.15	231.40	231.95	325.57	7.30
4553.00	46.20	319.20	4480.85	207.89	-145.66	253.40	253.84	324.98	6.09
4585.00	48.80	319.00	4502.47	225.72	-161.11	276.97	277.32	324.48	8.14
4617.00	51.90	321.40	4522.89	244.65	-176.86	301.60	301.89	324.14	11.28
4649.00	55.60	321.30	4541.81	264.80	-192.98	327.40	327.66	323.92	11.57
4680.00	58.90	320.40	4558.57	285.02	-209.44	353.46	353.69	323.69	10.92
4712.00	62.10	319.80	4574.33	306.38	-227.31	381.30	381.49	323.43	10.13
4743.00	64.80	318.20	4588.19	327.30	-245.50	409.00	409.14	323.13	9.86
4775.00	68.70	317.50	4600.81	349.09	-265.23	438.33	438.42	322.77	12.35
4807.00	72.90	318.50	4611.34	371.55	-285.44	468.48	468.54	322.47	13.45
4839.00	77.20	319.80	4619.59	394.93	-305.66	499.36	499.40	322.26	14.00
4870.00	81.50	320.70	4625.32	418.35	-325.13	529.81	529.84	322.15	14.16
4902.00	84.60	320.80	4629.19	442.95	-345.23	561.57	561.59	322.07	9.69
4934.00	84.80	320.40	4632.15	467.57	-365.45	593.43	593.44	321.99	1.39
4966.00	87.00	322.60	4634.43	492.54	-385.32	625.34	625.35	321.96	9.71
4998.00	90.00	323.50	4635.27	518.11	-404.54	657.32	657.33	322.02	9.79
5029.00	91.90	322.90	4634.76	542.92	-423.11	688.30	688.32	322.07	6.43
5061.00	91.60	322.90	4633.78	568.43	-442.40	720.28	720.30	322.11	9.4
5092.00	91.40	322.80	4632.97	593.13	-461.12	751.26	751.29	322.14	7.2
5124.00	91.60	322.70	4632.13	618.60	-480.48	783.24	783.28	322.16	7.0
5156.00	91.00	324.20	4631.40	644.30	-499.53	815.22	815.26	322.21	5.05
5188.00	90.90	323.20	4630.87	670.08	-518.47	847.19	847.25	322.27	3.14
5219.00	90.90	322.00	4630.39	694.71	-537.30	878.18	878.24	322.28	3.87
5251.00	92.70	322.60	4629.38	720.01	-556.86	910.16	910.22	322.28	5.93

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Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	Distance FT	CLOSURE		Dogleg Severity Deg/100
								Direction Deg	Direction Deg	
5283.00	92.60	323.50	4627.90	745.56	-576.07	942.12	942.19	322.31	283	
5314.00	92.70	322.00	4626.47	770.21	-594.82	973.08	973.15	322.32	484	
5346.00	92.60	323.60	4624.99	795.67	-614.14	1005.04	1005.12	322.34	500	
5377.00	91.70	322.40	4623.83	820.41	-632.78	1036.00	1036.09	322.36	484	
5409.00	92.10	323.10	4622.77	845.86	-652.14	1067.98	1068.07	322.37	252	
5441.00	91.60	321.20	4621.73	871.12	-671.77	1099.96	1100.05	322.36	614	
5472.00	90.90	320.40	4621.06	895.13	-691.36	1130.95	1131.03	322.32	343	
5502.00	90.20	318.60	4620.77	917.95	-710.84	1160.93	1161.00	322.25	644	
5533.00	89.80	318.50	4620.77	941.18	-731.36	1191.88	1191.93	322.15	133	
5563.00	89.30	318.40	4621.00	963.63	-751.26	1221.84	1221.87	322.06	170	
5594.00	89.10	318.30	4621.44	986.79	-771.86	1252.78	1252.80	321.97	72	
5625.00	90.50	318.50	4621.54	1009.97	-792.44	1283.73	1283.75	321.88	456	
5655.00	90.60	317.70	4621.26	1032.30	-812.47	1313.67	1313.68	321.80	269	
5686.00	90.80	317.90	4620.88	1055.26	-833.29	1344.60	1344.60	321.70	91	
5716.00	91.00	319.20	4620.41	1077.75	-853.15	1374.56	1374.56	321.63	438	
5747.00	91.10	318.60	4619.84	1101.10	-873.52	1405.51	1405.52	321.57	196	
5778.00	90.90	318.10	4619.30	1124.26	-894.12	1436.46	1436.46	321.50	174	
5809.00	90.70	317.70	4618.86	1147.26	-914.90	1467.39	1467.40	321.43	144	
5839.00	90.50	317.90	4618.55	1169.49	-935.05	1497.32	1497.34	321.36	94	
5869.00	90.20	318.50	4618.37	1191.85	-955.05	1527.27	1527.29	321.29	224	
5900.00	89.70	318.10	4618.39	1215.00	-975.67	1558.22	1558.25	321.23	207	
5931.00	89.60	320.80	4618.58	1238.55	-995.82	1589.19	1589.23	321.20	872	
5961.00	89.60	323.00	4618.79	1262.15	-1014.33	1619.19	1619.23	321.21	733	
5991.00	89.00	321.30	4619.16	1285.84	-1032.74	1649.18	1649.22	321.23	601	
6022.00	89.00	320.60	4619.70	1309.91	-1052.26	1680.18	1680.22	321.22	226	
6053.00	90.10	323.60	4619.94	1334.37	-1071.30	1711.17	1711.21	321.24	1031	
6084.00	90.30	322.40	4619.84	1359.13	-1089.96	1742.16	1742.19	321.27	392	
6115.00	90.30	322.30	4619.67	1383.67	-1108.90	1773.16	1773.19	321.29	32	
6145.00	90.10	323.20	4619.57	1407.55	-1127.05	1803.15	1803.18	321.32	307	
6176.00	90.10	322.60	4619.51	1432.27	-1145.75	1834.14	1834.16	321.34	194	
6206.00	90.50	324.20	4619.36	1456.36	-1163.64	1864.13	1864.14	321.37	550	
6237.00	90.30	324.40	4619.14	1481.53	-1181.73	1895.09	1895.10	321.42	91	
6268.00	90.50	323.00	4618.93	1506.51	-1200.08	1926.07	1926.08	321.46	456	
6299.00	90.60	322.70	4618.63	1531.22	-1218.80	1957.06	1957.07	321.48	102	

Office of State Gas
WV Department of
Environmental Protection
05/26/2017

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	Distance FT	CLOSURE Direction Deg	Dogleg Severity Deg/100
6329.00	90.70	322.70	4618.29	1555.08	-1236.98	1987.05	1987.06	321.50	3.3
6360.00	90.70	322.90	4617.91	1579.77	-1255.72	2018.05	2018.05	321.52	4.5
6391.00	90.50	322.40	4617.58	1604.42	-1274.53	2049.04	2049.04	321.54	1.74
6422.00	90.60	324.20	4617.29	1629.27	-1293.05	2080.02	2080.02	321.56	5.82
6452.00	90.90	322.50	4616.89	1653.34	-1310.96	2110.01	2110.01	321.59	5.75
6483.00	90.90	323.60	4616.41	1678.11	-1329.59	2140.99	2140.99	321.61	3.55
6514.00	90.90	324.10	4615.92	1703.13	-1347.87	2171.96	2171.96	321.64	1.61
6545.00	91.10	322.50	4615.38	1727.98	-1366.40	2202.95	2202.95	321.66	5.20
6575.00	89.80	322.40	4615.14	1751.77	-1384.68	2232.94	2232.94	321.68	4.35
6606.00	89.60	323.70	4615.31	1776.54	-1403.31	2263.93	2263.93	321.69	4.24
6637.00	89.40	322.40	4615.58	1801.31	-1421.95	2294.92	2294.92	321.71	4.24
6668.00	89.40	322.00	4615.90	1825.81	-1440.95	2325.91	2325.92	321.72	1.29
6698.00	88.80	323.50	4616.37	1849.68	-1459.10	2355.90	2355.91	321.73	5.38
6729.00	88.70	321.60	4617.05	1874.29	-1477.95	2386.89	2386.90	321.74	6.14
6759.00	88.30	322.00	4617.83	1897.85	-1496.49	2416.88	2416.89	321.74	1.89
6789.00	88.20	322.10	4618.75	1921.50	-1514.93	2446.87	2446.87	321.75	.47
6820.00	89.10	322.30	4619.48	1945.99	-1533.93	2477.86	2477.86	321.75	2.97
6851.00	88.90	323.40	4620.02	1970.69	-1552.64	2508.84	2508.85	321.77	3.61
6882.00	88.80	321.60	4620.64	1995.28	-1571.51	2539.83	2539.84	321.78	5.81
6912.00	88.80	321.10	4621.27	2018.70	-1590.24	2569.82	2569.83	321.77	1.67
6942.00	88.60	322.60	4621.95	2042.29	-1608.77	2599.82	2599.83	321.77	5.04
6973.00	89.50	321.00	4622.47	2066.65	-1627.94	2630.81	2630.82	321.77	5.92
7004.00	89.80	320.50	4622.66	2090.65	-1647.55	2661.81	2661.81	321.76	1.88
7034.00	89.90	320.90	4622.73	2113.87	-1666.55	2691.80	2691.81	321.75	1.37
7065.00	91.40	319.70	4622.38	2137.72	-1686.35	2722.79	2722.80	321.73	6.20
7096.00	90.70	321.20	4621.81	2161.61	-1706.09	2753.78	2753.78	321.72	5.34
7126.00	90.40	318.70	4621.53	2184.58	-1725.39	2783.76	2783.76	321.70	8.39
7157.00	91.00	321.40	4621.15	2208.34	-1745.29	2814.74	2814.75	321.68	8.92
7188.00	91.60	321.40	4620.44	2232.56	-1764.63	2845.74	2845.74	321.68	1.94
7219.00	91.20	319.60	4619.69	2256.47	-1784.34	2876.72	2876.72	321.66	5.95
7249.00	91.40	320.60	4619.01	2279.48	-1803.58	2906.70	2906.70	321.65	3.40
7280.00	91.10	321.00	4618.33	2303.50	-1823.16	2937.69	2937.69	321.64	1.61
7311.00	91.30	319.50	4617.68	2327.32	-1842.98	2968.67	2968.67	321.62	4.88
7341.00	91.20	319.30	4617.03	2350.10	-1862.50	2998.64	2998.64	321.60	.75

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05/26/2017

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
7372.00	91.40	319.30	4616.32	2373.59	-1882.71	3029.61	3029.61	321.58	6.5
7403.00	91.50	320.40	4615.54	2397.28	-1902.69	3060.58	3060.59	321.56	3.56
7433.00	91.90	320.60	4614.65	2420.42	-1921.77	3090.57	3090.57	321.55	1.49
7464.00	92.20	320.20	4613.54	2444.29	-1941.51	3121.54	3121.54	321.54	1.61
7495.00	91.90	320.20	4612.43	2468.09	-1961.34	3152.51	3152.51	321.53	.97
7525.00	92.20	320.60	4611.36	2491.19	-1980.46	3182.48	3182.49	321.52	1.67
7556.00	89.60	322.00	4610.87	2515.38	-1999.83	3213.48	3213.48	321.51	9.53
7587.00	90.00	320.10	4610.98	2539.49	-2019.32	3244.47	3244.48	321.51	6.26
7618.00	89.80	320.10	4611.03	2563.27	-2039.20	3275.46	3275.47	321.50	.65
7648.00	89.90	320.50	4611.11	2586.35	-2058.37	3305.45	3305.46	321.49	1.37
7678.00	90.20	320.20	4611.08	2609.45	-2077.51	3335.45	3335.46	321.47	1.41
7709.00	90.00	319.90	4611.03	2633.21	-2097.42	3366.43	3366.45	321.46	1.16
7740.00	89.60	321.40	4611.14	2657.18	-2117.07	3397.43	3397.44	321.45	5.01
7771.00	88.90	320.80	4611.54	2681.31	-2136.54	3428.42	3428.44	321.45	2.97
7801.00	88.20	319.10	4612.30	2704.26	-2155.83	3458.40	3458.42	321.44	6.13
7832.00	88.10	318.50	4613.30	2727.58	-2176.24	3489.35	3489.37	321.41	1.96
7863.00	88.70	320.70	4614.17	2751.17	-2196.32	3520.31	3520.34	321.40	7.35
7893.00	88.30	319.70	4614.96	2774.21	-2215.52	3550.29	3550.32	321.39	3.59
7924.00	89.20	321.30	4615.63	2798.13	-2235.23	3581.28	3581.31	321.38	5.92
7956.00	88.90	322.30	4616.16	2823.27	-2255.02	3613.27	3613.30	321.38	3.26
7987.00	88.40	323.30	4616.89	2847.96	-2273.76	3644.26	3644.29	321.40	3.61
8019.00	88.10	323.00	4617.87	2873.55	-2292.94	3676.23	3676.26	321.41	1.33
8051.00	88.20	322.00	4618.90	2898.92	-2312.41	3708.21	3708.23	321.42	3.14
8082.00	88.30	324.00	4619.85	2923.67	-2331.05	3739.19	3739.21	321.43	6.46
8114.00	89.30	323.20	4620.52	2949.42	-2350.04	3771.16	3771.18	321.45	4.00
8146.00	89.30	324.30	4620.91	2975.22	-2368.96	3803.13	3803.15	321.47	3.44
8177.00	89.10	324.60	4621.34	3000.44	-2386.98	3834.09	3834.10	321.50	1.16
8208.00	88.80	322.90	4621.91	3025.44	-2405.31	3865.07	3865.07	321.51	5.57
8240.00	89.40	324.70	4622.41	3051.26	-2424.20	3897.04	3897.04	321.53	5.93
8271.00	89.60	323.30	4622.69	3076.33	-2442.43	3928.01	3928.01	321.55	4.56
8303.00	90.50	325.20	4622.66	3102.30	-2461.12	3959.97	3959.97	321.57	6.57
8334.00	90.50	322.70	4622.39	3127.36	-2479.36	3990.94	3990.94	321.59	8.06
8366.00	90.30	323.60	4622.16	3152.97	-2498.55	4022.93	4022.93	321.61	2.88
8398.00	89.50	323.10	4622.22	3178.64	-2517.65	4054.92	4054.92	321.62	2.95

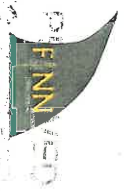
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 Department
 Dogleg
 05/26/2017

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	Distance FT	Dogleg Deg	Dogleg Deg
8430.00	89.40	323.00	4622.53	3204.21	-2536.89	4086.90	4086.90	321.63	4.24
8461.00	90.30	324.10	4622.61	3229.15	-2555.31	4117.89	4117.89	321.64	4.58
8492.00	90.30	322.00	4622.45	3253.92	-2573.94	4148.87	4148.88	321.66	6.77
8524.00	90.90	323.00	4622.11	3279.31	-2593.42	4180.87	4180.87	321.66	3.64
8556.00	92.00	323.80	4621.30	3304.99	-2612.49	4212.84	4212.84	321.67	4.25
8588.00	92.70	323.00	4619.99	3330.66	-2631.55	4244.80	4244.80	321.69	3.32
8619.00	92.80	322.30	4618.50	3355.27	-2650.34	4275.76	4275.76	321.69	2.28
8651.00	92.90	323.50	4616.91	3380.76	-2669.62	4307.71	4307.71	321.70	3.76
8683.00	92.80	323.10	4615.32	3406.39	-2688.72	4339.66	4339.66	321.72	1.29
8714.00	92.50	321.80	4613.89	3430.94	-2707.59	4370.62	4370.63	321.72	4.30
8746.00	92.20	322.60	4612.57	3456.20	-2727.19	4402.59	4402.60	321.72	2.67
8778.00	92.20	323.90	4611.34	3481.82	-2746.32	4434.55	4434.56	321.74	4.06
8809.00	92.50	321.70	4610.07	3506.49	-2765.04	4465.52	4465.53	321.74	7.16
8841.00	93.50	324.00	4608.40	3531.96	-2784.34	4497.47	4497.48	321.75	7.83
8872.00	94.50	323.30	4606.24	3556.87	-2802.67	4528.37	4528.38	321.76	3.93
8904.00	93.80	322.40	4603.92	3582.31	-2821.94	4560.28	4560.29	321.77	3.56
8936.00	93.80	322.90	4601.80	3607.69	-2841.31	4592.20	4592.22	321.78	1.56
8967.00	93.80	322.90	4599.75	3632.36	-2859.97	4623.13	4623.15	321.78	.00
P8HL									
9012.00	93.80	322.90	4596.76	3668.17	-2887.06	4668.02	4668.04	321.80	.00

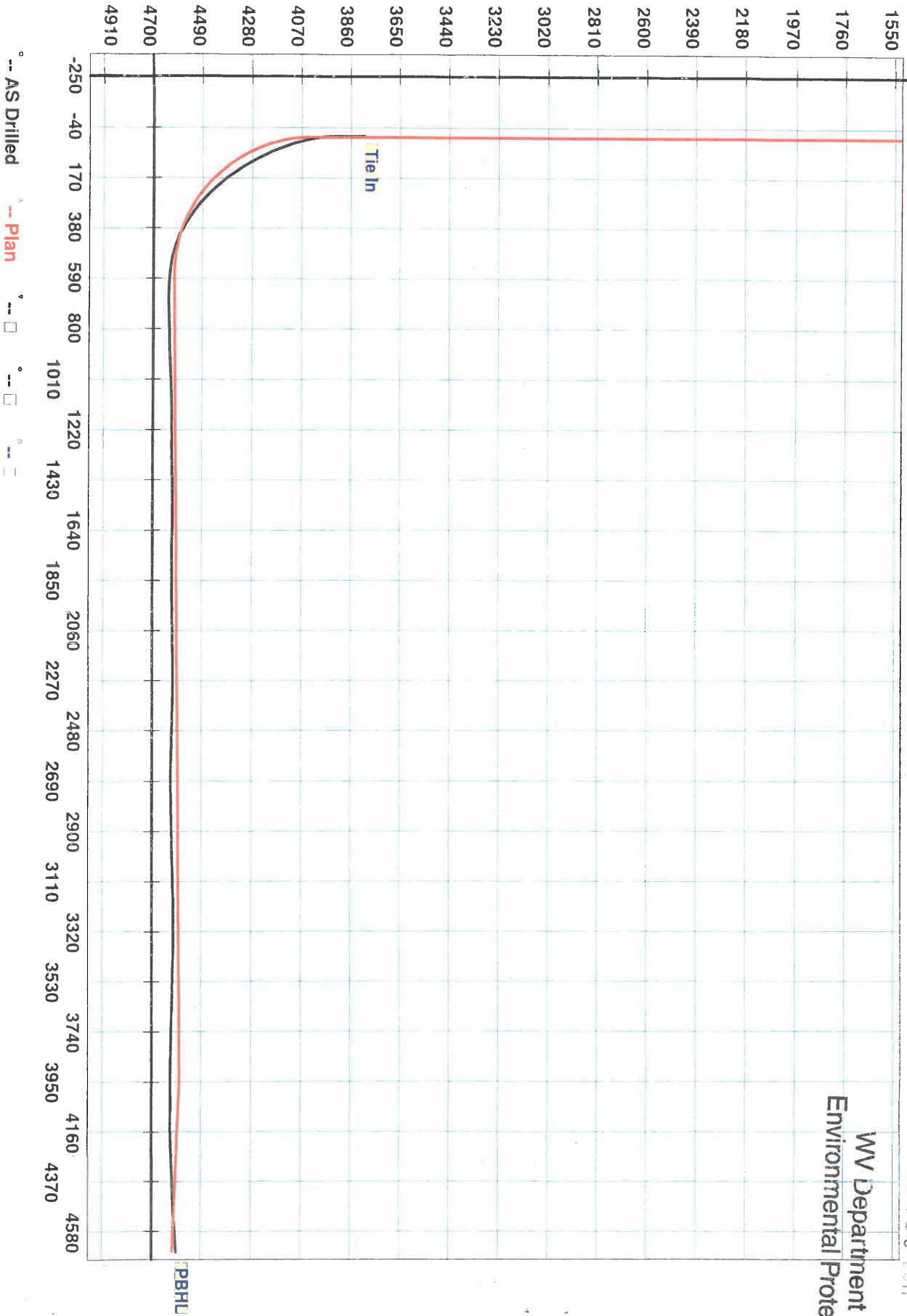
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Company: Quality Natural Gas LLC
Lease/Well: Logan Coal & Timber #2403
Location: Mingo Co
Rig Name: Highlands 6
State/Country: WV

File name: C:\WINSERVER\WV00916.SVY



ANALYSIS DATE

**WV Department of
 Environmental Protection**



05/26/2017



Job Number: WV00916
 Company: Quality Natural Gas LLC
 Lease/Well: Logan Coal & Timber #2403
 Location: Mingo Co
 Rig Name: Highlands 6
 RKB:
 G.L. or M.S.L.:

State/Country: WV
 Declination: -7.28
 Grid: True
 File name: C:\WINSERVE\WV00916.SVY
 Date/Time: 03-Dec-16 / 05:19
 Curve Name: AS Drilled

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 APR 28 2017
 WV Department of
 Environmental Protection
 05/26/2017

Finn Directional Inc.

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drit Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	Distance FT	CLOSURE		Dogleg Severity Deg/100
								Direction Deg	Direction Deg	
3800.00	.35	128.60	3799.66	7.33	15.46	-3.85	17.11	64.63		.00
3891.00	.10	31.00	3890.66	7.22	15.72	-4.10	17.30	65.31		.41
3923.00	.20	114.10	3922.66	7.23	15.78	-4.14	17.36	65.40		.66
3954.00	3.10	328.30	3953.64	7.92	15.39	-3.35	17.31	62.78		10.54
3986.00	7.50	324.70	3985.50	10.36	13.73	-.40	17.20	52.97		13.78
4017.00	10.70	322.70	4016.11	14.30	10.82	4.49	17.93	37.10		10.37
4049.00	12.80	319.90	4047.43	19.38	6.73	11.01	20.51	19.16		6.80
4080.00	15.00	322.10	4077.52	25.17	2.06	18.45	25.25	4.67		7.30
4112.00	16.70	323.50	4108.31	32.13	-3.22	27.19	32.29	354.27		5.44
4144.00	18.10	325.20	4138.84	39.91	-8.80	36.75	40.87	347.57		4.65
4176.00	20.60	325.50	4169.03	48.63	-14.82	47.33	50.84	343.05		7.82



End of 7.9" csg @ 2518'

Casing Hanger @ 2320'

KOP 3917
BOC 4998'

Predator II OH Packer Set @ 4498'

Strata Port
3.65" ID @ 4631'
Open @ 1860 psi
Use 3.750" ball

Predator II OH Packer Set @ 4763'

Strata Port
3.53" ID @ 4854'
Open @ 1860 psi
Use 3.625" ball

Predator II OH Packer Set @ 4945'

Strata Port
3.40" ID @ 5035'
Open @ 1860 psi
Use 3.50" ball

Predator II OH Packer Set @ 5168'

Strata Port
3.28" ID @ 5300'
Open @ 1860 psi
Use 3.375" ball

Predator II OH Packer Set @ 5433'

Strata Port
3.15" ID @ 5565'
Open @ 1860 psi
Use 3.25" ball

Predator II OH Packer Set @ 5697'

Strata Port
3.03" ID @ 5830'
Open @ 1860 psi
Use 3.125" ball

Predator II OH Packer Set @ 5921'

Strata Port
2.90" ID @ 6011'
Open @ 2170 psi
Use 3.00" ball

Predator II OH Packer Set @ 6144'

Predator II OH Packer Set @ 6527'

Strata Port
2.78" ID @ 6660'
Open @ 2170 psi
Use 2.875" ball

Predator II OH Packer Set @ 6750'

Strata Port
2.65" ID @ 6841'
Open @ 2170 psi
Use 2.75" ball

Predator II OH Packer Set @ 6932'

Strata Port
2.53" ID @ 7023'
Open @ 2170 psi
Use 2.625" ball

Predator II OH Packer Set @ 7113'

Strata Port
2.40" ID @ 7204'
Open @ 2170 psi
Use 2.50" ball

Predator II OH Packer Set @ 7295'



DOWN HOLE WELL PROFILE					
WELL NAME	Logan Coal & Timber #2403			DATE	12/3/16
SUPERVISOR	Darrell Fluharty			TOOL HAND	David McCauley
PHONE #	606-548-1915			PHONE #	304-472-5555
RIG #	Highlands Rig 6			FIELD TICKET #	0
ELEVATIONS					
	GL ELEV	KB ELEV		RIG KBD	TVD
		0		7	4618.00
CASING / OPEN HOLE LAYOUT	OD (IN)	LANDED DEPTH	WEIGHT (LB/FT)	TOP OF (FTKB)	
CASING DESCRIPTION	7	2518.00	20	0	
WINDOW DESCRIPTION	6 1/4			3,917.00	
OPEN HOLE DESCRIPTION	6 1/4	9013.00		JUNCTION @	3917.00

Liner Placement Schematic

DOWNHOLE DESCRIPTION FROM BOTTOM UP				
BOTTOM @	DESCRIPTION	LENGTH	ID	OD
8816.38	4 1/2" Floated Pump Out Plug	0.85	750"	5,000
8815.53	1 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	41.75	4,000	4,500
8773.78	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
8773.16	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
8769.16	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8766.06	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
8682.56	7 x 4 1/2" Strata-Port Frac Sleeve w/ 1.5313 ID Seat (Activate with 1.625" Ball)	3.55	1,531	5,688
8679.01	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8675.91	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
8592.41	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
8591.79	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
8587.79	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8584.69	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
8501.19	7 x 4 1/2" Strata-Port Frac Sleeve w/ 1.6563 ID Seat (Activate with 1.750" Ball)	3.55	1,656	5,688
8497.64	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8494.54	3 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	125.30	4,000	4,500
8369.24	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
8368.62	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
8364.62	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8361.52	3 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	125.30	4,000	4,500
8236.22	7 x 4 1/2" Strata-Port Frac Sleeve w/ 1.7813 ID Seat (Activate with 1.875" Ball)	3.55	1,781	5,688
8232.67	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8229.57	3 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	125.15	4,000	4,500
8104.42	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
8103.80	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
8099.80	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8096.70	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.55	4,000	4,500
8013.15	7 x 4 1/2" Strata-Port Frac Sleeve w/ 1.9063 ID Seat (Activate with 2.000" Ball)	3.55	1,906	5,688
8009.60	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
8006.50	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
7923.00	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
7922.38	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
7918.38	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7915.28	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.55	4,000	4,500
7831.73	7 x 4 1/2" Strata-Port Frac Sleeve w/ 2.0313 ID Seat (Activate with 2.125" Ball)	3.55	2,031	5,688
7828.18	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7825.08	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
7741.58	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
7740.96	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
7736.96	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7733.86	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.55	4,000	4,500
7650.31	7 x 4 1/2" Strata-Port Frac Sleeve w/ 2.1563 ID Seat (Activate with 2.250" Ball)	3.55	2,156	5,688
7646.76	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7643.66	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
7560.16	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
7559.54	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
7555.54	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7552.44	3 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	125.30	4,000	4,500
7427.14	7 x 4 1/2" Strata-Port Frac Sleeve w/ 2.2813 ID Seat (Activate with 2.375" Ball)	3.55	2,281	5,688
7423.59	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7420.49	3 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	125.30	4,000	4,500
7295.19	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
7294.57	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
7290.57	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7287.47	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.40	4,000	4,500
7204.07	7 x 4 1/2" Strata-Port Frac Sleeve w/ 2.4063 ID Seat (Activate with 2.500" Ball)	3.55	2,406	5,688
7200.52	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7197.42	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.55	4,000	4,500
7113.87	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
7113.25	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
7109.25	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7106.15	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
7022.65	7 x 4 1/2" Strata-Port Frac Sleeve w/ 2.5313 ID Seat (Activate with 2.625" Ball)	3.55	2,531	5,688
7019.10	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
7016.00	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.55	4,000	4,500
6932.45	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
6931.83	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
6927.83	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
6924.73	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
6841.23	7 x 4 1/2" Strata-Port Frac Sleeve w/ 2.6563 ID Seat (Activate with 2.750" Ball)	3.55	2,656	5,688
6837.68	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
6834.58	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.55	4,000	4,500
6751.03	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
6750.41	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
6746.41	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
6743.31	2 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	83.50	4,000	4,500
6659.81	7 x 4 1/2" Strata-Port Frac Sleeve w/ 2.7813 ID Seat (Activate with 2.875" Ball)	3.55	2,781	5,688
6656.26	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
6653.16	3 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	125.30	4,000	4,500
6527.86	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,750
6527.24	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
6523.24	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500
6520.14	9 Joints 4 1/2", 11.6#, N-80 Liner with LTC Threads	375.75	4,000	4,500
6144.39	7 x 4 1/2" Peak Rotational Centralizer	0.62	3,995	5,688
6143.77	7 x 4 1/2" Predator II Open Hole Isolation Packer	4.00	3,995	5,688
6139.77	4 1/2" P-110 Liner Sub with LTC Threads	3.10	4,000	4,500

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