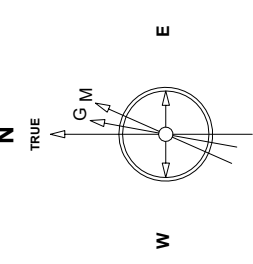


Great Western Operating Company, LLC

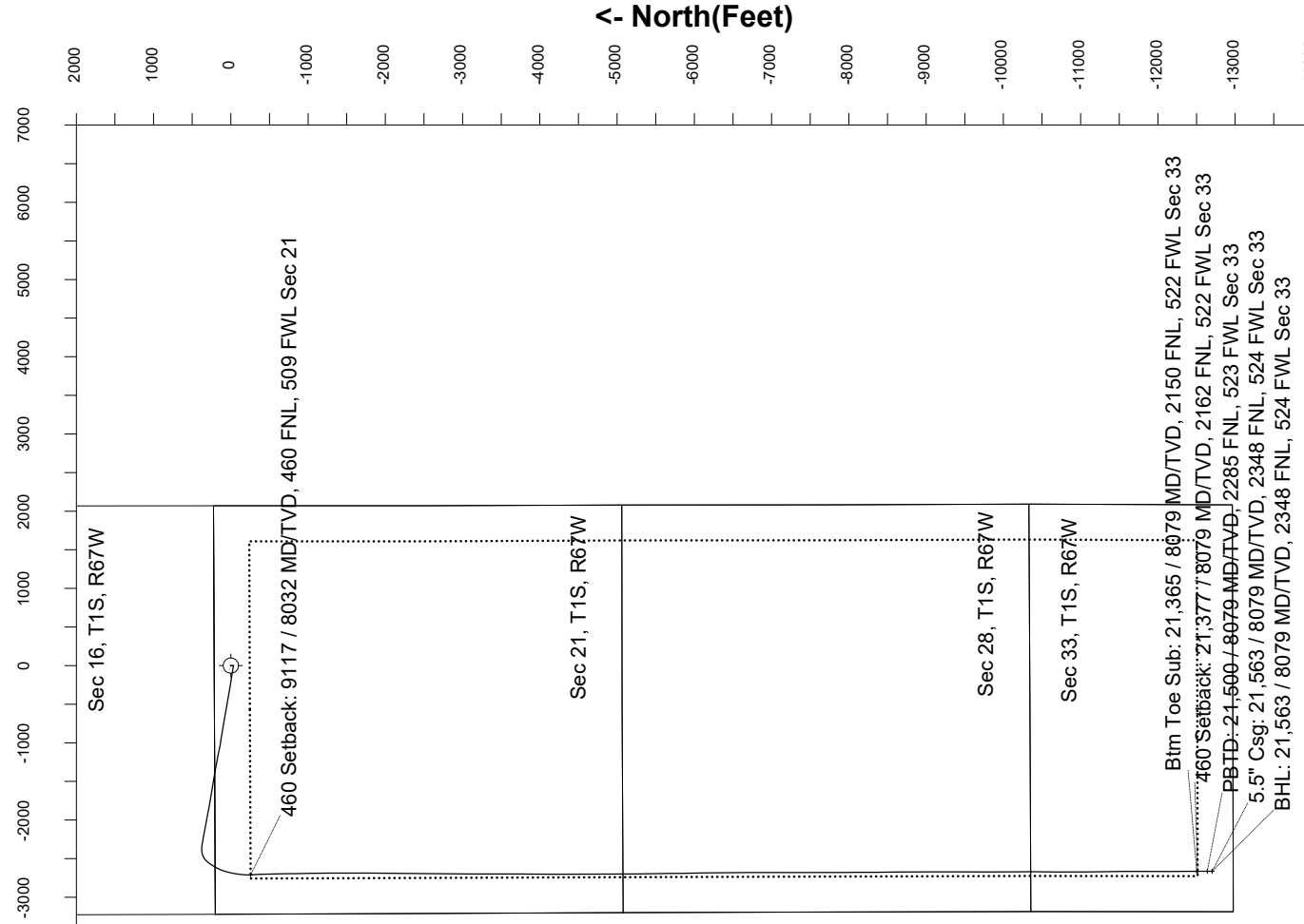
Location	Colorado	Slot	N04 - Kortum LD 33-179HC
Field	Wattenburg	Well	Kortum LD 33-179HC
Installation	Kortum	Wellbore	Kortum LD 33-179HC (AWB)

Created by: rmount
 Date plotted: 2-Sep-2020
 Plot reference is Kortum LD 33-179HC (AWB).
 Ref wellpath is Kortum LD 33-179HC (AWP#1).
 Coordinates are in Feet reference N04 - Kortum LD 33-179HC.
 True Vertical Depths are reference Rig Datum.
 Measured Depths are reference Rig Datum.
 Rig Datum: Floor
 Rig Datum to Mean Sea Level: 5212.00 ft.
 Plot North is aligned to TRUE North.

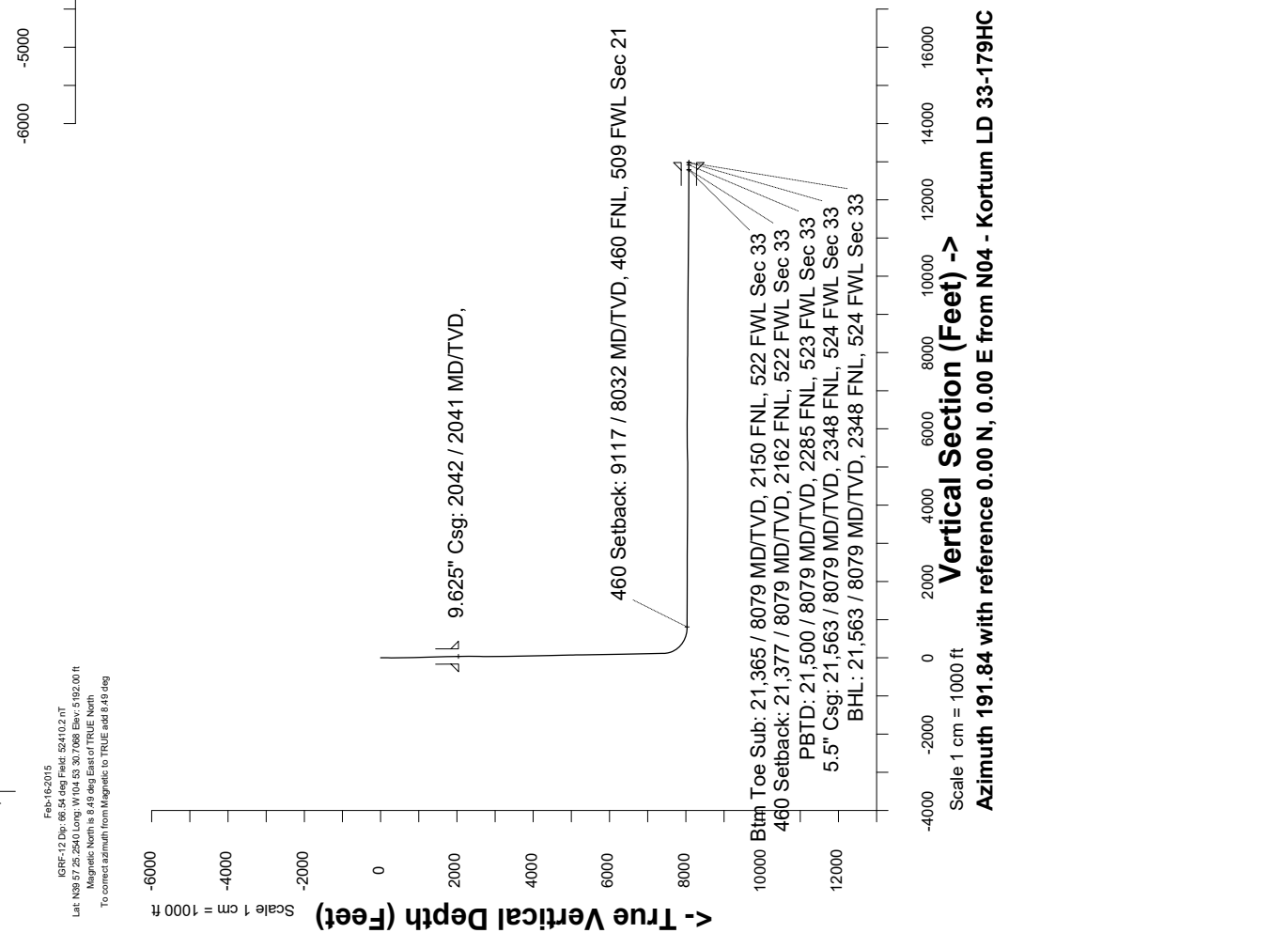


Feb-16-2016
 KBRF-12.Dwg: 66.54 deg Field: 52410.2.0T
 Lat: N39 57.25; 2540 Long: W 104 53.30; 7068 Elev: 5192.00 ft.
 Magnetic North is 8.49 deg East of TRUE North.
 To correct azimuth from Magnetic to TRUE add 8.49 deg

Scale 1 cm = 500 ft



Scale 1 cm = 1000 ft



Great Western Operating Co, LLC
 Directional Survey Report
 Wellpath: Kortum LD 33-179HC
 MDs and TVDs are from Rig Floor 5212.0ft above Mean Sea Level

Wellpath Report

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	DLS [deg/100ft]	Vertical Section[ft]
0.00	0.00	0.00	0.00	0.00	0.00		0.00
20.00	0.00	290.55	20.00	0.00	0.00	==>	0.00
97.00	0.13	290.55	97.00	0.03	-0.08	0.17	-0.01
189.00	0.22	4.73	189.00	0.24	-0.16	0.24	-0.20
276.00	0.22	37.69	276.00	0.54	-0.05	0.14	-0.52
368.00	0.53	26.26	368.00	1.06	0.25	0.34	-1.09
458.00	0.44	19.23	457.99	1.76	0.55	0.12	-1.84
547.00	0.53	209.25	546.99	1.73	0.46	1.09	-1.78
637.00	1.76	187.28	636.97	-0.01	0.08	1.43	-0.01
727.00	1.76	179.89	726.93	-2.76	-0.09	0.25	2.72
817.00	1.45	185.17	816.90	-5.28	-0.19	0.38	5.20
907.00	1.63	167.50	906.86	-7.66	-0.02	0.56	7.50
997.00	1.80	168.29	996.82	-10.29	0.54	0.19	9.96
1086.00	2.20	170.31	1085.77	-13.35	1.12	0.46	12.83
1176.00	2.15	177.43	1175.70	-16.74	1.48	0.31	16.08
1266.00	1.85	174.80	1265.65	-19.87	1.69	0.35	19.10
1356.00	1.54	188.07	1355.61	-22.51	1.65	0.55	21.70
1446.00	2.11	179.10	1445.56	-25.37	1.51	0.71	24.52
1536.00	1.76	182.88	1535.51	-28.40	1.46	0.41	27.50
1626.00	1.41	186.66	1625.48	-30.88	1.27	0.41	29.97
1716.00	1.05	181.74	1715.46	-32.81	1.11	0.42	31.88
1805.00	1.36	195.27	1804.44	-34.64	0.81	0.47	33.74
1895.00	0.66	277.98	1894.43	-35.60	0.01	1.59	34.84
1986.00	0.53	273.06	1985.42	-35.51	-0.92	0.15	34.94
2067.00	0.88	256.11	2066.42	-35.64	-1.90	0.50	35.27
2157.00	0.07	203.71	2156.41	-35.85	-2.60	0.93	35.62
2246.00	0.09	175.95	2245.41	-35.97	-2.61	0.05	35.74
2336.00	0.22	344.69	2335.41	-35.88	-2.65	0.34	35.66
2426.00	0.19	98.07	2425.41	-35.73	-2.55	0.38	35.49
2515.00	0.28	186.07	2514.41	-35.97	-2.43	0.37	35.70
2605.00	1.54	319.43	2604.40	-35.27	-3.24	1.94	35.18
2694.00	0.25	61.51	2693.39	-34.27	-3.84	1.81	34.32
2784.00	0.54	290.35	2783.39	-34.02	-4.07	0.81	34.14
2873.00	3.69	280.01	2872.32	-33.38	-7.28	3.55	34.16
2963.00	6.15	287.04	2961.98	-31.46	-14.75	2.81	33.82
3052.00	8.14	277.11	3050.29	-29.29	-25.56	2.62	33.91
3142.00	7.37	278.48	3139.46	-27.65	-37.59	0.88	34.77
3232.00	11.64	276.53	3228.21	-25.76	-52.33	4.76	35.95
3321.00	15.45	280.53	3314.72	-22.57	-72.91	4.41	37.06
3411.00	20.10	276.47	3400.40	-18.64	-100.08	5.34	38.78
3500.00	22.45	276.86	3483.33	-14.88	-132.15	2.65	41.69
3589.00	25.08	280.67	3564.78	-9.36	-167.57	3.42	43.55
3679.00	27.82	278.37	3645.36	-2.77	-207.10	3.25	45.22
3769.00	29.89	280.45	3724.18	4.36	-249.94	2.56	47.04
3859.00	29.86	279.49	3802.22	12.12	-294.09	0.53	48.50
3949.00	28.87	279.26	3880.65	19.31	-337.63	1.11	50.40
4038.00	29.20	286.48	3958.49	28.93	-379.67	3.95	49.62
4128.00	29.80	280.46	4036.84	39.22	-422.72	3.36	48.38
4218.00	29.91	278.53	4114.90	46.60	-466.90	1.07	50.22
4308.00	30.35	278.92	4192.74	53.46	-511.56	0.54	52.67
4398.00	29.78	279.71	4270.63	60.75	-556.05	0.77	54.67
4487.00	30.73	277.81	4347.51	67.57	-600.37	1.52	57.09
4577.00	30.38	281.49	4425.02	75.23	-645.45	2.11	58.85
4667.00	30.04	279.18	4502.80	83.36	-690.00	1.35	60.04
4757.00	29.89	276.77	4580.77	89.60	-734.51	1.35	63.07
4847.00	30.94	279.25	4658.39	95.96	-779.61	1.82	66.10
4936.00	31.00	278.30	4734.70	102.95	-824.87	0.55	68.55
5026.00	30.49	281.26	4812.06	110.75	-870.20	1.77	70.21
5115.00	29.04	280.96	4889.31	119.27	-913.56	1.64	70.78
5205.00	29.88	279.49	4967.67	127.12	-957.12	1.23	72.04
5295.00	29.94	279.19	5045.69	134.40	-1001.40	0.18	74.00
5384.00	30.01	279.39	5122.78	141.58	-1045.28	0.14	75.98
5474.00	30.16	281.32	5200.66	149.69	-1089.66	1.09	77.15
5563.00	30.04	281.78	5277.66	158.62	-1133.39	0.29	77.38

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	DLS [deg/100ft]	Vertical Section[ft]
5653.00	30.01	281.69	5355.58	167.78	-1177.48	0.06	77.46
5742.00	29.39	282.37	5432.89	176.97	-1220.61	0.79	77.32
5832.00	29.95	283.02	5511.09	186.76	-1264.07	0.72	76.66
5921.00	30.21	278.42	5588.11	195.05	-1307.87	2.61	77.54
6011.00	30.15	279.73	5665.92	202.18	-1352.54	0.73	79.73
6100.00	29.17	278.60	5743.25	209.20	-1396.02	1.27	81.78
6190.00	30.08	279.54	5821.49	216.22	-1439.95	1.14	83.93
6279.00	29.35	278.67	5898.79	223.21	-1483.51	0.95	86.03
6369.00	29.78	279.26	5977.07	230.13	-1527.37	0.58	88.26
6458.00	29.76	279.59	6054.32	237.36	-1570.97	0.19	90.12
6548.00	30.13	278.86	6132.31	244.57	-1615.31	0.58	92.18
6637.00	30.35	279.44	6209.20	251.69	-1659.56	0.41	94.28
6727.00	29.91	279.69	6287.04	259.20	-1704.11	0.51	96.08
6816.00	30.39	280.31	6364.00	266.96	-1748.13	0.64	97.52
6906.00	30.33	280.48	6441.65	275.17	-1792.87	0.12	98.67
6996.00	28.99	280.69	6519.86	283.35	-1836.65	1.49	99.65
7085.00	30.58	280.07	6597.10	291.31	-1880.14	1.82	100.78
7175.00	30.57	280.43	6674.59	299.46	-1925.19	0.20	102.06
7265.00	30.13	282.11	6752.25	308.34	-1969.78	1.06	102.52
7354.00	30.25	278.63	6829.19	316.39	-2013.79	1.97	103.67
7444.00	30.68	282.23	6906.77	324.66	-2058.65	2.08	104.79
7533.00	30.32	279.29	6983.46	333.09	-2103.01	1.72	105.63
7623.00	29.87	280.25	7061.33	340.75	-2147.48	0.73	107.27
7712.00	29.62	282.83	7138.60	349.58	-2190.74	1.47	107.51
7802.00	30.47	278.03	7216.52	357.70	-2235.03	2.83	108.64
7892.00	28.55	279.04	7294.84	364.27	-2278.87	2.20	111.21
7981.00	30.38	277.84	7372.33	370.68	-2322.17	2.16	113.83
8070.00	30.60	277.70	7449.02	376.79	-2366.91	0.26	117.03
8160.00	29.88	262.50	7526.89	376.93	-2411.91	8.52	126.13
8250.00	31.50	247.85	7604.39	365.12	-2455.97	8.48	146.73
8339.00	35.27	233.79	7678.80	341.13	-2498.32	9.65	178.90
8429.00	40.04	223.01	7750.11	304.55	-2539.10	9.02	223.07
8518.00	45.10	213.99	7815.70	257.41	-2576.31	8.90	276.85
8608.00	51.30	208.90	7875.68	200.16	-2611.15	8.07	340.03
8697.00	58.39	203.23	7926.92	134.81	-2642.94	9.51	410.52
8787.00	65.10	196.42	7969.54	60.29	-2669.65	10.00	488.93
8877.00	73.08	191.33	8001.65	-21.26	-2689.69	10.32	572.85
8966.00	80.51	186.63	8021.98	-106.76	-2703.15	9.80	659.30
9056.00	87.75	182.29	8031.18	-195.94	-2710.08	9.36	748.01
9100.00	90.06	178.81	8032.02	-239.92	-2710.50	9.49	791.14
9145.00	90.09	175.14	8031.97	-284.85	-2708.13	8.16	834.62
9235.00	90.00	178.03	8031.90	-374.68	-2702.77	3.21	921.44
9324.00	89.78	179.09	8032.07	-463.65	-2700.53	1.22	1008.06
9414.00	89.82	178.64	8032.38	-553.63	-2698.75	0.50	1095.76
9504.00	90.71	179.11	8031.96	-643.62	-2696.98	1.12	1183.46
9593.00	89.14	179.33	8032.08	-732.60	-2695.77	1.78	1270.30
9682.00	89.45	179.24	8033.18	-821.59	-2694.66	0.36	1357.17
9772.00	89.63	179.41	8033.90	-911.58	-2693.60	0.28	1445.03
9861.00	89.45	177.80	8034.61	-1000.55	-2691.43	1.82	1531.65
9951.00	89.26	178.47	8035.63	-1090.49	-2688.50	0.77	1619.08
10041.00	90.12	179.56	8036.11	-1180.48	-2686.96	1.54	1706.83
10130.00	89.78	179.59	8036.19	-1269.48	-2686.30	0.38	1793.80
10220.00	90.12	181.14	8036.27	-1359.47	-2686.87	1.76	1882.00
10310.00	89.94	180.70	8036.22	-1449.46	-2688.31	0.53	1970.37
10399.00	89.91	179.49	8036.34	-1538.46	-2688.46	1.36	2057.50
10489.00	89.88	180.18	8036.50	-1628.46	-2688.20	0.77	2145.53
10578.00	89.88	179.80	8036.69	-1717.46	-2688.19	0.43	2232.63
10668.00	89.78	179.76	8036.96	-1807.45	-2687.84	0.12	2320.64
10758.00	90.43	179.81	8036.79	-1897.45	-2687.50	0.72	2408.66
10847.00	90.34	180.07	8036.19	-1986.45	-2687.41	0.31	2495.74
10937.00	90.22	180.59	8035.75	-2076.45	-2687.93	0.59	2583.93
11026.00	90.15	180.23	8035.47	-2165.45	-2688.57	0.41	2671.16
11116.00	89.14	180.80	8036.02	-2255.44	-2689.37	1.29	2759.41
11206.00	89.26	181.05	8037.28	-2345.42	-2690.83	0.31	2847.77
11295.00	89.14	180.88	8038.52	-2434.40	-2692.33	0.23	2935.16
11385.00	89.60	181.18	8039.51	-2524.38	-2693.94	0.61	3023.56
11475.00	89.20	181.21	8040.46	-2614.35	-2695.82	0.45	3112.00
11564.00	89.14	180.81	8041.74	-2703.33	-2697.39	0.45	3199.41
11654.00	90.34	180.16	8042.15	-2793.32	-2698.15	1.52	3287.64
11743.00	90.03	180.34	8041.87	-2882.32	-2698.54	0.40	3374.82
11833.00	89.97	180.19	8041.87	-2972.32	-2698.96	0.18	3462.99
11922.00	89.51	179.77	8042.27	-3061.32	-2698.92	0.70	3550.09

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	DLS [deg/100ft]	Vertical Section[ft]
12012.00	89.75	179.75	8042.85	-3151.32	-2698.55	0.27	3638.09
12101.00	88.34	179.79	8044.33	-3240.30	-2698.19	1.58	3725.11
12191.00	88.74	180.11	8046.63	-3330.27	-2698.11	0.57	3813.15
12280.00	89.69	180.01	8047.85	-3419.26	-2698.20	1.07	3900.26
12370.00	90.00	180.13	8048.09	-3509.26	-2698.31	0.37	3988.37
12459.00	90.58	179.63	8047.64	-3598.26	-2698.13	0.86	4075.43
12549.00	90.55	180.52	8046.75	-3688.25	-2698.25	0.99	4163.54
12638.00	90.12	180.05	8046.23	-3777.25	-2698.69	0.72	4250.73
12727.00	90.37	180.30	8045.85	-3866.25	-2698.96	0.40	4337.89
12817.00	90.09	180.10	8045.49	-3956.25	-2699.27	0.38	4426.04
12906.00	90.03	180.36	8045.40	-4045.25	-2699.63	0.30	4513.21
12996.00	89.88	180.51	8045.47	-4135.24	-2700.32	0.24	4601.44
13085.00	89.63	180.59	8045.85	-4224.24	-2701.17	0.29	4688.71
13175.00	89.78	180.36	8046.31	-4314.23	-2701.92	0.31	4776.94
13265.00	89.75	180.30	8046.68	-4404.23	-2702.43	0.07	4865.13
13354.00	90.03	180.25	8046.85	-4493.23	-2702.86	0.32	4952.32
13444.00	90.37	180.40	8046.54	-4583.23	-2703.37	0.41	5040.51
13534.00	89.82	179.98	8046.39	-4673.23	-2703.67	0.77	5128.66
13623.00	90.95	179.77	8045.79	-4762.22	-2703.48	1.29	5215.72
13713.00	90.83	179.07	8044.39	-4852.21	-2702.57	0.79	5303.60
13802.00	90.83	179.01	8043.10	-4941.19	-2701.07	0.07	5390.38
13892.00	90.80	179.47	8041.82	-5031.17	-2699.88	0.51	5478.20
13982.00	90.80	179.30	8040.57	-5121.15	-2698.91	0.19	5566.07
14071.00	91.02	178.95	8039.15	-5210.13	-2697.56	0.46	5652.87
14160.00	90.80	179.03	8037.74	-5299.11	-2695.99	0.26	5739.63
14250.00	91.75	179.13	8035.74	-5389.07	-2694.54	1.06	5827.39
14339.00	90.12	179.65	8034.28	-5478.05	-2693.60	1.92	5914.28
14429.00	90.06	179.49	8034.14	-5568.05	-2692.92	0.19	6002.22
14518.00	89.85	179.36	8034.21	-5657.05	-2692.03	0.28	6089.14
14608.00	90.15	179.77	8034.21	-5747.04	-2691.34	0.56	6177.08
14698.00	89.14	179.27	8034.77	-5837.04	-2690.59	1.25	6265.00
14787.00	89.78	179.45	8035.61	-5926.03	-2689.60	0.75	6351.89
14877.00	90.12	179.70	8035.69	-6016.02	-2688.93	0.47	6439.84
14966.00	89.82	178.95	8035.73	-6105.02	-2687.88	0.91	6526.72
15056.00	87.51	179.58	8037.83	-6194.98	-2686.72	2.66	6614.53
15145.00	88.98	179.07	8040.56	-6283.93	-2685.68	1.75	6701.37
15235.00	88.43	178.87	8042.59	-6373.89	-2684.06	0.65	6789.09
15325.00	89.08	178.85	8044.55	-6463.85	-2682.27	0.72	6876.76
15414.00	89.54	179.29	8045.62	-6552.83	-2680.82	0.72	6963.55
15503.00	89.88	179.75	8046.07	-6641.83	-2680.08	0.64	7050.50
15593.00	90.68	179.31	8045.63	-6731.82	-2679.34	1.01	7138.43
15682.00	90.74	179.63	8044.53	-6820.81	-2678.52	0.37	7225.35
15772.00	89.23	178.82	8044.55	-6910.80	-2677.30	1.90	7313.18
15861.00	90.15	181.12	8045.03	-6999.79	-2677.25	2.78	7400.26
15951.00	90.12	180.92	8044.82	-7089.78	-2678.86	0.22	7488.66
16040.00	89.97	179.21	8044.75	-7178.77	-2678.96	1.93	7575.79
16130.00	90.03	180.06	8044.75	-7268.77	-2678.38	0.95	7663.75
16219.00	89.38	180.83	8045.21	-7357.77	-2679.07	1.13	7750.99
16309.00	89.35	181.20	8046.20	-7447.75	-2680.67	0.41	7839.38
16399.00	89.45	179.94	8047.15	-7537.73	-2681.56	1.40	7927.64
16488.00	89.45	179.52	8048.00	-7626.73	-2681.15	0.47	8014.65
16578.00	89.17	179.69	8049.09	-7716.72	-2680.52	0.36	8102.60
16667.00	89.17	179.07	8050.37	-7805.71	-2679.56	0.70	8189.50
16757.00	89.94	180.05	8051.07	-7895.70	-2678.87	1.38	8277.43
16846.00	89.91	179.44	8051.19	-7984.70	-2678.47	0.69	8364.45
16936.00	90.09	179.50	8051.19	-8074.69	-2677.64	0.21	8452.36
17026.00	89.69	180.14	8051.36	-8164.69	-2677.36	0.84	8540.39
17115.00	89.23	179.65	8052.20	-8253.69	-2677.20	0.76	8627.45
17204.00	89.57	179.90	8053.13	-8342.68	-2676.85	0.47	8714.48
17294.00	88.92	179.56	8054.32	-8432.67	-2676.42	0.82	8802.47
17384.00	89.42	179.39	8055.62	-8522.66	-2675.60	0.59	8890.37
17473.00	89.82	179.37	8056.21	-8611.65	-2674.64	0.45	8977.27
17563.00	89.82	179.36	8056.50	-8701.65	-2673.64	==>	9065.14
17653.00	90.03	179.34	8056.61	-8791.64	-2672.62	0.23	9153.01
17742.00	89.75	179.49	8056.78	-8880.63	-2671.71	0.36	9239.93
17832.00	89.82	179.38	8057.12	-8970.63	-2670.82	0.14	9327.82
17921.00	89.91	179.55	8057.33	-9059.63	-2669.99	0.22	9414.75
18011.00	89.91	180.49	8057.47	-9149.62	-2670.02	1.04	9502.84
18101.00	89.88	180.47	8057.64	-9239.62	-2670.77	0.04	9591.08
18190.00	89.69	180.34	8057.97	-9328.62	-2671.40	0.26	9678.31
18280.00	89.82	180.45	8058.36	-9418.61	-2672.02	0.19	9766.52
18370.00	89.75	180.19	8058.70	-9508.61	-2672.53	0.30	9854.70

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	DLS [deg/100ft]	Vertical Section[ft]
18459.00	89.75	180.24	8059.08	-9597.61	-2672.86	0.06	9941.88
18549.00	89.60	179.88	8059.59	-9687.61	-2672.96	0.43	10029.98
18638.00	89.60	179.75	8060.22	-9776.61	-2672.67	0.15	10117.02
18728.00	90.37	179.65	8060.24	-9866.60	-2672.20	0.86	10205.01
18817.00	89.20	179.12	8060.57	-9955.60	-2671.24	1.44	10291.91
18907.00	89.60	180.26	8061.52	-10045.59	-2670.75	1.34	10379.88
18996.00	89.78	179.87	8062.00	-10134.59	-2670.86	0.48	10467.01
19086.00	89.17	178.96	8062.82	-10224.58	-2669.94	1.22	10554.90
19176.00	89.39	178.72	8063.95	-10314.55	-2668.11	0.36	10642.58
19264.00	88.98	181.77	8065.20	-10402.53	-2668.49	3.50	10728.76
19354.00	88.65	180.94	8067.07	-10492.49	-2670.62	0.99	10817.24
19443.00	88.86	181.16	8069.00	-10581.45	-2672.25	0.34	10904.64
19533.00	88.80	180.90	8070.84	-10671.42	-2673.87	0.30	10993.03
19622.00	88.74	179.79	8072.75	-10760.39	-2674.40	1.25	11080.22
19712.00	90.15	179.79	8073.62	-10850.39	-2674.07	1.57	11168.23
19801.00	89.82	179.10	8073.64	-10939.38	-2673.21	0.86	11255.15
19891.00	89.78	179.37	8073.96	-11029.37	-2672.01	0.30	11342.98
19981.00	90.74	179.85	8073.55	-11119.37	-2671.40	1.19	11430.94
20070.00	89.88	179.00	8073.07	-11208.36	-2670.50	1.36	11517.85
20160.00	89.26	178.70	8073.74	-11298.34	-2668.70	0.77	11605.54
20249.00	89.29	178.94	8074.87	-11387.31	-2666.86	0.27	11692.25
20338.00	89.20	179.75	8076.04	-11476.30	-2665.85	0.92	11779.13
20428.00	89.17	179.32	8077.32	-11566.29	-2665.12	0.48	11867.05
20517.00	89.88	180.85	8078.06	-11655.28	-2665.25	1.90	11954.18
20607.00	89.78	180.59	8078.33	-11745.27	-2666.38	0.31	12042.49
20697.00	89.66	179.95	8078.77	-11835.27	-2666.80	0.72	12130.65
20786.00	89.75	179.72	8079.22	-11924.27	-2666.55	0.28	12217.70
20876.00	90.18	179.43	8079.28	-12014.27	-2665.88	0.58	12305.65
20965.00	90.22	180.11	8078.97	-12103.26	-2665.52	0.77	12392.68
21055.00	90.15	179.57	8078.68	-12193.26	-2665.27	0.61	12480.71
21145.00	90.25	179.91	8078.36	-12283.26	-2664.86	0.39	12568.71
21234.00	89.66	179.72	8078.43	-12372.26	-2664.58	0.70	12655.75
21324.00	90.15	180.14	8078.58	-12462.26	-2664.47	0.72	12743.81
21414.00	89.57	179.57	8078.80	-12552.26	-2664.24	0.90	12831.85
21503.00	90.25	179.82	8078.94	-12641.26	-2663.76	0.81	12918.86
21539.00	90.00	179.85	8078.86	-12677.26	-2663.66	0.70	12954.07
21563.00	90.00	179.85	8078.86	-12701.26	-2663.60	==>	12977.55