



TUG HILL
OPERATING

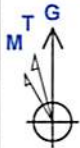
Well: Greer 1S-03M
Site: Greer Unit N
Project: Marshall County, West Virginia
Design: rev4

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	5449.00	23.48	313.07	5415.74	202.66	-240.65	0.00	0.00	-292.15	Survey @ 5449.00 MD 5415.74 TVD
2	5679.00	23.48	313.07	5626.69	265.24	-307.60	0.00	0.00	-378.90	KOP Begin 10°/100' drop/turn
3	5779.00	13.79	305.08	5721.35	285.74	-331.96	10.00	-169.00	-408.47	Begin 10°/100' drop build/turn
4	6793.97	89.00	149.96	6414.56	-225.12	-117.71	10.00	-154.58	143.09	Begin 89.00° lateral section
5	13033.68	89.00	149.96	6523.00	-5625.62	3005.88	0.00	0.00	6378.32	PBHL/TD 13033.68 MD/6523.00 TVD

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
2642.00	3.56	302.55	2639.99	-1.15	-33.46	-14.75	72.87	MWD surveys
12997.00	90.15	146.36	6462.39	-5560.43	2977.99	6307.68	7233.39	Survey @ 12997.00 MD 6462.39 TVD
13059.00	90.15	146.36	6462.23	-5612.05	3012.34	6369.39	7295.39	Survey projected to 13059.00 MD 6462.23 TVD

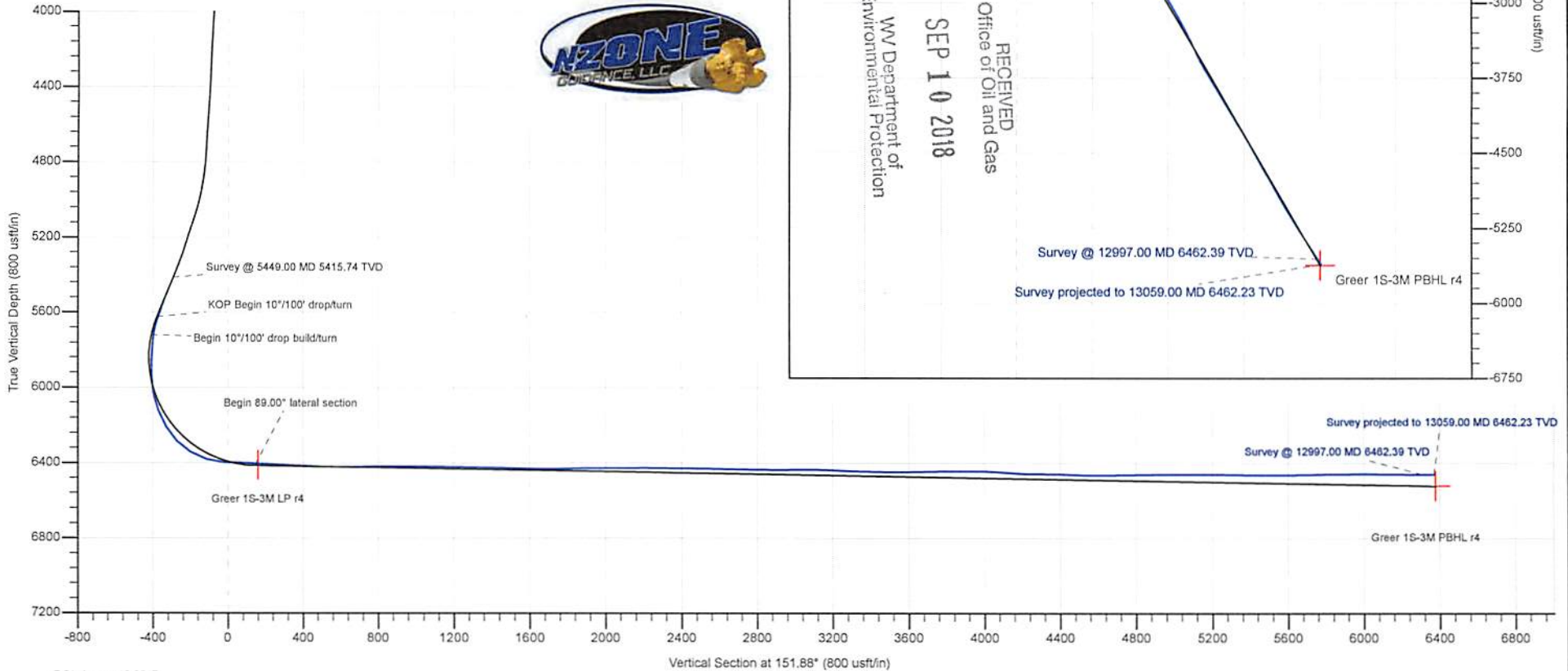


Azimuths to Grid North
True North: -0.10°
Magnetic North: -8.70°

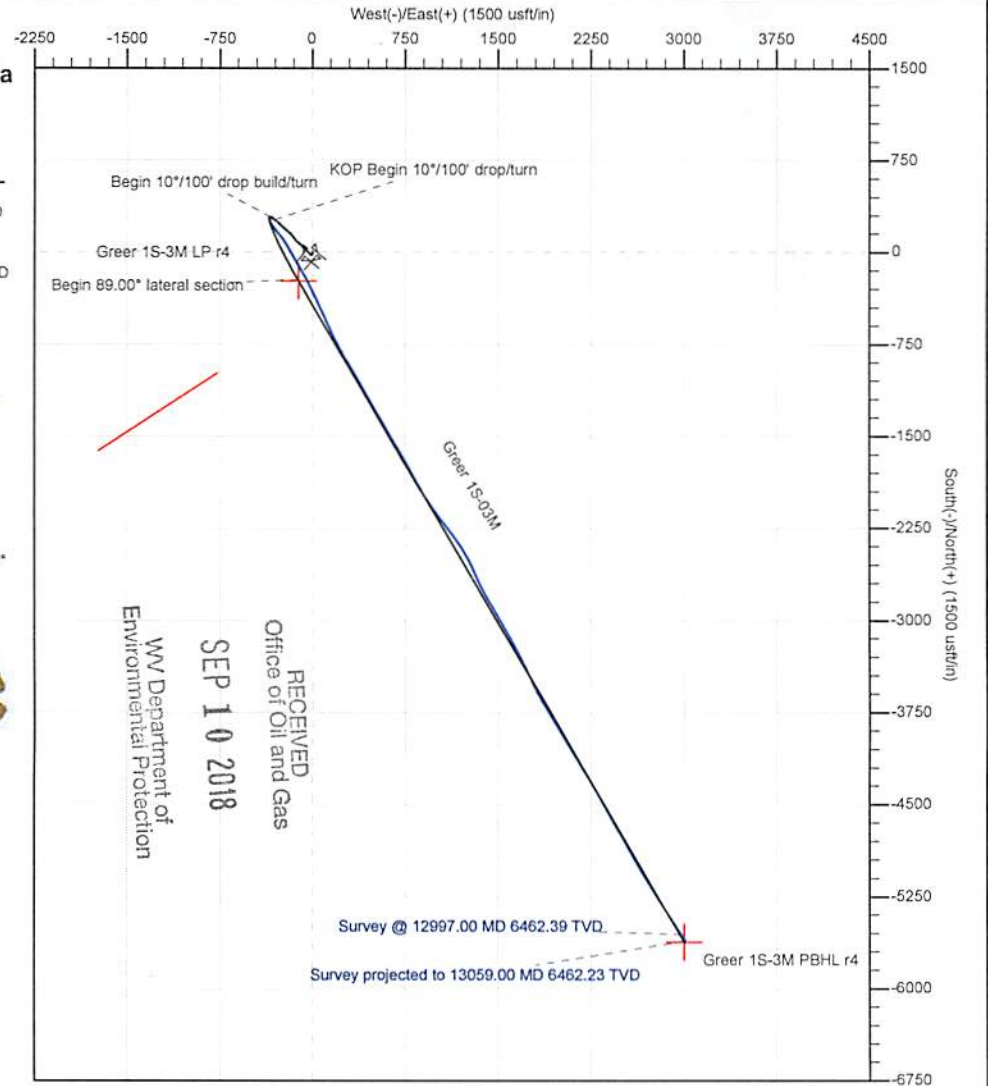
Magnetic Field
Strength: 52173.6snT
Dip Angle: 66.95°
Date: 6/15/2017
Model: IGRF2015

Surface Location: RKB=1254+26 @ 1280.00usft (Nabors B28)
Universal Transverse Mercator (US Survey Feet)
Zone 17N (84 W to 78 W)
Northing Easting Latitude Longitude
14438294.82 1686418.17 39.75700984 -80.83631754

Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Subtract 8.70°



Vertical Section at 151.88° (800 usft/in)



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Survey Report

Service Company:	NZone Directional, LLC	Location:	New Martinsville
Well:	Greer 1S-03HM	Rig:	Nabors B28
API or UWI:	47-051-01888	Job Number:	THO-17-015
State:	West Virginia	Operating Company:	Tug Hill Operating, LLC
County:	Marshall	Magnetic Declination:	0
Country:	USA	Proposed Azimuth:	151.88
Comment		North Reference:	GRID
		Latitude:	39.75701
		Longitude:	-80.8363

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Tie-In Data

MD	Inclination	Azimuth	TVD	NS	EW
0	0	0	0	0	0

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Survey Data

MD	Inclination	Azimuth	TVD	NS	EW	CA	CD	VS	DLS
100	0.09	15.56	100	0.08	0.02	15.56	0.08	-0.06	0.09
200	0.15	355.98	200	0.28	0.03	6.67	0.28	-0.23	0.07
300	0.18	336.7	300	0.56	-0.04	356.06	0.56	-0.51	0.06
400	0.04	306.88	400	0.72	-0.13	349.92	0.73	-0.7	0.15
500	0.08	314.64	500	0.79	-0.21	345.42	0.82	-0.8	0.04
600	0.08	291.14	600	0.87	-0.32	339.68	0.92	-0.92	0.03
700	0.05	94.39	700	0.89	-0.34	338.92	0.95	-0.94	0.13
800	0.07	53.15	800	0.92	-0.25	344.82	0.95	-0.93	0.05
900	0.15	39.8	900	1.06	-0.12	353.67	1.07	-0.99	0.08
1000	0.03	38.87	1000	1.18	-0.02	359.17	1.18	-1.05	0.12
1100	0.16	49.67	1100	1.29	0.11	4.69	1.29	-1.09	0.13
1200	0.32	69.58	1200	1.48	0.47	17.78	1.55	-1.08	0.18
1300	0.53	80.8	1299.99	1.65	1.19	35.86	2.04	-0.89	0.22
1400	0.75	116.53	1399.99	1.43	2.23	57.36	2.65	-0.21	0.45
1500	2.26	163.46	1499.95	-0.75	3.38	102.53	3.46	2.26	1.83
1600	2.9	170.34	1599.85	-5.14	4.37	139.62	6.74	6.59	0.71
1700	3.51	185.51	1699.7	-10.68	4.5	157.16	11.59	11.54	1.04
1800	3.86	212.71	1799.5	-16.56	2.38	171.8	16.73	15.73	1.76
1900	4.12	239.53	1899.26	-21.21	-2.53	186.8	21.36	17.51	1.87
2000	3.53	258.82	1999.05	-23.63	-8.65	200.1	25.16	16.76	1.41
2100	2.58	281.11	2098.91	-23.79	-13.88	210.25	27.54	14.44	1.5
2200	1.97	314.3	2198.83	-22.16	-17.32	218.01	28.12	11.38	1.42
2300	2.68	328.85	2298.75	-18.96	-19.75	226.18	27.38	7.41	0.92
2400	3.85	327.37	2398.58	-14.13	-22.77	238.19	26.8	1.73	1.17
2500	4.38	325.8	2498.33	-8.14	-26.73	253.06	27.94	-5.42	0.54
2530	4.22	322.94	2528.24	-6.31	-28.04	257.31	28.74	-7.65	0.89
2642	3.56	302.55	2639.99	-1.15	-33.46	268.02	33.48	-14.75	1.36
2706	3.24	293.4	2703.88	0.63	-36.79	270.99	36.8	-17.9	0.98
2800	2.98	311.7	2797.74	3.31	-41.05	274.61	41.19	-22.27	1.09
2894	2.82	323.59	2891.62	6.8	-44.25	278.74	44.77	-26.85	0.66
2991	2.18	313.4	2988.53	9.99	-47.01	282	48.06	-30.96	0.8
3085	2.19	303.68	3082.46	12.21	-49.8	283.78	51.27	-34.24	0.39

3179	2.93	314.91	3176.37	14.9	-53	285.71	55.05	-38.12	0.95
3274	3.05	317.51	3271.24	18.48	-56.42	288.14	59.37	-42.89	0.19
3368	2.67	313.8	3365.12	21.84	-59.69	290.1	63.56	-47.4	0.45
3463	2.3	302.46	3460.03	24.4	-62.9	291.2	67.46	-51.16	0.65
3652	2.76	315.3	3648.85	29.67	-69.3	293.18	75.38	-58.83	0.38
3746	3.27	319.01	3742.72	33.3	-72.65	294.62	79.92	-63.61	0.58
3842	3.27	318.36	3838.56	37.41	-76.26	296.13	84.95	-68.94	0.04
3937	2.67	312.96	3933.43	40.94	-79.68	297.2	89.59	-73.67	0.7
4029	3.29	307.55	4025.31	44.01	-83.34	297.84	94.25	-78.1	0.74
4123	3.55	308.96	4119.14	47.49	-87.75	298.42	99.77	-83.24	0.29
4217	2.97	322.65	4212.99	51.25	-91.49	299.26	104.86	-88.32	1.03
4312	2.59	329.19	4307.88	55.05	-94.08	300.34	109	-92.9	0.52
4406	3.15	317.01	4401.76	58.77	-96.93	301.23	113.35	-97.51	0.88
4501	3.64	315.79	4496.59	62.84	-100.81	301.94	118.79	-102.93	0.52
4596	3.17	313.07	4591.43	66.79	-104.83	302.5	124.3	-108.32	0.52
4691	2.8	309.32	4686.3	70.06	-108.55	302.84	129.19	-112.95	0.44
4785	4.67	308.44	4780.09	73.89	-113.32	303.11	135.28	-118.58	1.99
4880	8.79	311.07	4874.42	81.07	-121.82	303.64	146.33	-128.92	4.35
4974	12.52	318.04	4966.78	93.37	-134.06	304.86	163.37	-145.53	4.19
5069	17.02	325.47	5058.63	112.49	-148.83	307.08	186.56	-169.36	5.13
5164	19.07	321.55	5148.96	136.1	-166.37	309.29	214.94	-198.45	2.51
5259	18.58	307.47	5238.92	157.47	-188.04	309.94	245.27	-227.51	4.8
5353	21.8	310.7	5327.14	177.97	-213.17	309.86	277.69	-257.43	3.62
5449	23.48	313.07	5415.74	202.66	-240.65	310.1	314.62	-292.16	1.99
5520	22.77	313.53	5481.03	221.78	-260.95	310.36	342.46	-318.59	1.03
5615	22.9	310.8	5568.59	246.52	-288.27	310.54	379.3	-353.29	1.12
5710	16	312.04	5658.11	267.39	-312.01	310.6	410.91	-382.89	7.28
5804	5.45	309.05	5750.34	278.91	-325.14	310.62	428.38	-399.23	11.24
5899	5.14	290.85	5844.94	283.27	-332.62	310.42	436.89	-406.6	1.79
5994	7.65	225.29	5939.46	280.33	-341.1	309.41	441.51	-408.01	7.61
6089	13.32	181.43	6032.96	264.91	-345.88	307.45	435.67	-396.66	9.9
6183	20.84	155.24	6122.88	238.82	-339.13	305.15	414.78	-370.47	11.26
6278	31.52	144.52	6208.06	203.13	-317.56	302.61	376.97	-328.83	12.25
6373	42.99	140.03	6283.56	157.93	-282.22	299.23	323.4	-272.3	12.4
6468	59.03	145.57	6343.17	99.1	-238.07	292.6	257.88	-199.61	17.47
6562	72.48	148.91	6381.69	27.13	-191.92	278.05	193.83	-114.39	14.67
6657	88.84	150.58	6397.05	-53.58	-144.88	249.71	154.47	-21.03	17.31
6752	87.12	149.09	6400.4	-135.66	-97.18	215.62	166.87	73.84	2.39
6847	87.25	151.46	6405.07	-218.05	-50.13	192.95	223.74	168.68	2.5
6941	86.77	154.36	6409.97	-301.61	-7.39	181.4	301.7	262.53	3.12
7036	86.99	154.62	6415.14	-387.23	33.46	175.06	388.67	357.29	0.36
7130	88.04	155.33	6419.22	-472.32	73.19	171.19	477.96	451.06	1.35
7225	88.84	155.41	6421.81	-558.64	112.77	168.59	569.91	545.85	0.85
7319	90.07	155.06	6422.7	-643.99	152.14	166.71	661.72	639.68	1.36
7414	91.91	153.66	6421.06	-729.62	193.24	165.17	754.78	734.57	2.43
7509	90.77	152.51	6418.84	-814.3	236.23	163.82	847.88	829.52	1.7
7603	89.76	149.53	6418.4	-896.52	281.77	162.55	939.76	923.5	3.35

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7697	88.57	149.79	6419.77	-977.64	329.24	161.39	1031.59	1017.42	1.3
7792	89.01	149.7	6421.78	-1059.68	377.1	160.41	1124.78	1112.33	0.47
7886	90.24	152.34	6422.39	-1141.9	422.63	159.69	1217.6	1206.31	3.1
7981	89.58	149.88	6422.54	-1225.07	468.53	159.07	1311.61	1301.29	2.68
8076	87.74	149.35	6424.76	-1306.99	516.56	158.43	1405.37	1396.19	2.02
8170	88.04	149.7	6428.22	-1387.95	564.21	157.88	1498.25	1490.04	0.49
8265	88.13	149.88	6431.4	-1470.01	611.98	157.4	1592.3	1584.93	0.21
8359	90.11	149.53	6432.84	-1551.15	659.39	156.97	1685.49	1678.84	2.14
8453	90.86	149.44	6432.05	-1632.13	707.12	156.58	1778.73	1772.76	0.8
8547	91.25	150.67	6430.32	-1713.57	754.03	156.25	1872.13	1866.69	1.37
8642	89.93	151.63	6429.34	-1796.77	799.87	156	1966.77	1961.68	1.72
8737	90.24	151.11	6429.2	-1880.15	845.39	155.79	2061.47	2056.67	0.64
8831	90.99	150.23	6428.19	-1962.1	891.43	155.57	2155.1	2150.64	1.23
8926	89.67	148.82	6427.64	-2043.97	939.6	155.31	2249.59	2245.56	2.03
9021	88.35	141.97	6429.28	-2122.1	993.51	154.91	2343.16	2339.88	7.34
9116	90.11	143.02	6430.56	-2197.46	1051.34	154.43	2436.01	2433.59	2.16
9209	88.7	142.93	6431.53	-2271.7	1107.34	154.01	2527.22	2525.46	1.52
9304	88.18	144.52	6434.11	-2348.25	1163.53	153.64	2620.7	2619.47	1.76
9399	88.62	149.53	6436.77	-2427.89	1215.19	153.41	2715.03	2714.06	5.29
9494	89.58	151.63	6438.26	-2510.63	1261.85	153.32	2809.9	2809.01	2.43
9588	89.49	155.94	6439.02	-2594.94	1303.36	153.33	2903.87	2902.94	4.59
9683	90.99	155.94	6438.63	-2681.68	1342.09	153.41	2998.77	2997.7	1.58
9777	90.55	153.13	6437.36	-2766.53	1382.5	153.45	3092.73	3091.58	3.03
9872	86.24	148.38	6440.02	-2849.35	1428.87	153.37	3187.55	3186.47	6.75
9966	88	151.11	6444.75	-2930.43	1476.16	153.26	3281.23	3280.27	3.45
10061	88.92	150.32	6447.3	-3013.26	1522.61	153.19	3376.1	3375.22	1.28
10155	89.58	151.63	6448.53	-3095.44	1568.22	153.13	3470.03	3469.2	1.56
10250	90.07	150.58	6448.82	-3178.62	1614.12	153.08	3564.97	3564.19	1.22
10344	91.25	154.01	6447.74	-3261.82	1657.81	153.06	3658.94	3658.16	3.86
10439	90.68	153.39	6446.14	-3346.97	1699.9	153.07	3753.91	3753.1	0.89
10534	90.99	155.33	6444.75	-3432.6	1741	153.11	3848.88	3848	2.07
10629	89.41	154.36	6444.42	-3518.59	1781.38	153.15	3943.83	3942.86	1.95
10724	87.16	151.28	6447.27	-3603.05	1824.74	153.14	4038.77	4037.79	4.01
10818	84.53	150.84	6454.08	-3685.09	1870.11	153.09	4132.45	4131.53	2.84
10912	89.27	149.35	6459.16	-3766.42	1916.89	153.03	4226.16	4225.31	5.28
11007	90.37	148.47	6459.46	-3847.78	1965.95	152.94	4320.92	4320.18	1.48
11102	87.69	148.47	6461.06	-3928.73	2015.61	152.84	4415.61	4414.99	2.82
11197	87.65	148.65	6464.93	-4009.72	2065.12	152.75	4510.27	4509.75	0.19
11292	90.02	149.26	6466.86	-4091.09	2114.1	152.67	4605.04	4604.6	2.58
11387	90.9	149.53	6466.1	-4172.85	2162.47	152.61	4699.89	4699.51	0.97
11480	91.56	149.26	6464.1	-4252.88	2209.8	152.54	4792.72	4792.4	0.77
11575	90.37	150.14	6462.5	-4334.88	2257.73	152.49	4887.59	4887.32	1.56
11670	91.16	150.32	6461.23	-4417.34	2304.89	152.45	4982.51	4982.27	0.85
11766	89.27	150.49	6460.87	-4500.81	2352.3	152.41	5078.44	5078.23	1.98
11861	89.8	150.49	6461.64	-4583.48	2399.09	152.37	5173.39	5173.2	0.56
11956	89.05	150.14	6462.59	-4666.01	2446.14	152.33	5268.32	5268.16	0.87
12051	89.98	150.67	6463.4	-4748.61	2493.05	152.3	5363.27	5363.12	1.13

12145	89.19	151.2	6464.08	-4830.77	2538.71	152.28	5457.24	5457.11	1.01
12239	89.63	151.37	6465.05	-4913.21	2583.87	152.26	5551.22	5551.1	0.5
12334	90.77	149.61	6464.72	-4995.88	2630.67	152.23	5646.17	5646.06	2.21
12428	91.87	149.61	6462.55	-5076.94	2678.21	152.19	5740.04	5739.96	1.17
12523	90.81	148.56	6460.33	-5158.42	2727	152.14	5834.88	5834.82	1.57
12618	90.55	147.94	6459.2	-5239.2	2776.99	152.07	5929.66	5929.62	0.71
12712	89.8	147.86	6458.91	-5318.82	2826.94	152.01	6023.41	6023.39	0.8
12807	88.57	149.26	6460.27	-5399.86	2876.48	151.96	6118.23	6118.22	1.96
12902	89.36	147.59	6461.98	-5480.78	2926.22	151.9	6213.03	6213.03	1.94
12997	90.15	146.36	6462.39	-5560.43	2977.99	151.83	6307.68	6307.68	1.54

Projected Survey

MD	Inclination	Azimuth	TVD	NS	EW	CA	CD	VS	DLS	
13059	90.15	146.36	6462.23	-5612.05	3012.34	151.77	6369.4	6369.39	0	
DigiDrill DataLogger		1-Jan								www.digidrill.com

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