



# Weatherford®

## SURVEY REPORT

Report Date: **9/3/2013**  
 Customer: **Anadarko**  
 Job Name: **4030232**  
 Well Name: **Howard 30C-28HZ**

Field: **Wattenberg**  
 Rig: **Xtreme 23**  
 Rig Loc: **Weld County**

Survey Calculation Method: <b>Minimum Curvature</b>						
Magnetic Reference	Target Direction	Total Magnetic Field	Magnetic Dip Angle	Magnetic Declination	Grid Convergence	Total Correction
<b>True North</b>	<b>359.65 deg</b>	<b>52617 nT</b>	<b>66.64 deg</b>	<b>8.65 deg</b>	<b>0.00 deg</b>	<b>8.65 deg</b>
Survey Tie-On	Depth	INC	AZ	TVD	NS	EW
	<b>931.00 ft</b>	<b>0.08 deg</b>	<b>167.35 deg</b>	<b>930.99 ft</b>	<b>-0.76 ft</b>	<b>-2.86 ft</b>

Depth (ft)	Inc (deg)	Azm (deg)	TVD (ft)	Well Head		VSect (ft)	Dogleg (deg/100ft)
				NS (ft)	EW (ft)		
1054.00	0.16	46.37	1053.99	-0.73	-2.72	-0.71	0.17
1145.00	2.29	256.88	1144.97	-1.05	-4.40	-1.02	2.67
1236.00	4.01	267.28	1235.83	-1.61	-9.35	-1.56	1.98
1327.00	6.21	265.23	1326.46	-2.17	-17.43	-2.07	2.43
1418.00	7.54	265.53	1416.80	-3.05	-28.29	-2.88	1.46
1515.00	9.46	265.70	1512.73	-4.14	-42.58	-3.88	1.98
1607.00	10.79	264.00	1603.30	-5.61	-58.69	-5.25	1.48
1700.00	12.34	257.92	1694.41	-8.60	-77.06	-8.13	2.12
1793.00	13.64	256.33	1785.03	-13.27	-97.44	-12.68	1.45
1885.00	14.60	252.88	1874.25	-19.25	-119.06	-18.52	1.39
1979.00	16.23	251.78	1964.87	-26.84	-142.86	-25.97	1.76
2072.00	16.04	252.56	2054.20	-34.76	-167.46	-33.73	0.31
2165.00	16.49	253.28	2143.48	-42.41	-192.36	-41.23	0.53
2256.00	16.83	255.06	2230.66	-49.52	-217.46	-48.19	0.67
2348.00	15.29	254.62	2319.07	-56.17	-242.03	-54.69	1.68
2440.00	15.45	254.88	2407.78	-62.58	-265.55	-60.96	0.19
2533.00	14.84	257.25	2497.55	-68.44	-289.13	-66.68	0.93
2625.00	14.95	259.31	2586.46	-73.24	-312.28	-71.34	0.59
2718.00	15.02	260.46	2676.29	-77.47	-335.95	-75.41	0.33
2811.00	14.65	261.57	2766.19	-81.19	-359.47	-78.99	0.50
2904.00	14.63	260.08	2856.18	-84.94	-382.67	-82.60	0.41
2997.00	14.41	259.57	2946.21	-89.05	-405.62	-86.57	0.27
3089.00	13.93	262.64	3035.41	-92.54	-427.86	-89.93	0.97
3182.00	13.63	260.41	3125.73	-95.80	-449.77	-93.06	0.66
3274.00	14.79	266.88	3214.92	-98.25	-472.19	-95.36	2.14
3359.00	15.71	269.06	3296.93	-99.03	-494.53	-96.01	1.28
3445.00	16.33	267.10	3379.59	-99.83	-518.24	-96.66	0.96
3530.00	17.22	263.54	3460.97	-101.85	-542.68	-98.53	1.60
3616.00	17.08	262.84	3543.15	-104.86	-567.86	-101.39	0.29
3701.00	16.49	263.46	3624.53	-107.79	-592.23	-104.17	0.73
3786.00	15.04	262.49	3706.33	-110.60	-615.15	-106.84	1.73
3872.00	14.76	257.31	3789.44	-114.47	-636.90	-110.58	1.58
3957.00	15.71	255.52	3871.45	-119.72	-658.61	-115.70	1.25
4042.00	16.33	253.04	3953.15	-126.09	-681.18	-121.92	1.09
4128.00	16.56	254.43	4035.63	-132.90	-704.55	-128.60	0.53

Depth (ft)	Inc (deg)	Azm (deg)	TVD (ft)	Well Head		VSect (ft)	Dogleg (deg/100ft)
				NS (ft)	EW (ft)		
4213.00	16.29	257.30	4117.16	-138.78	-727.85	-134.33	1.01
4299.00	17.08	257.88	4199.54	-144.08	-751.96	-139.48	0.94
4384.00	18.33	257.68	4280.52	-149.55	-777.23	-144.80	1.47
4469.00	18.06	257.21	4361.27	-155.32	-803.13	-150.41	0.36
4555.00	17.53	256.96	4443.15	-161.20	-828.75	-156.13	0.62
4640.00	18.47	255.75	4523.99	-167.40	-854.27	-162.18	1.19
4726.00	18.61	256.02	4605.53	-174.07	-880.79	-168.68	0.19
4811.00	17.78	258.05	4686.28	-180.03	-906.65	-174.49	1.23
4896.00	17.82	258.06	4767.21	-185.41	-932.07	-179.71	0.05
4982.00	18.23	258.29	4848.99	-190.86	-958.12	-185.00	0.48
5067.00	19.92	258.13	4929.32	-196.54	-985.31	-190.52	1.99
5153.00	18.65	257.43	5010.49	-202.54	-1013.07	-196.35	1.50
5238.00	17.01	257.88	5091.40	-208.11	-1038.49	-201.77	1.94
5324.00	14.62	258.41	5174.14	-212.94	-1061.43	-206.45	2.78
5409.00	13.43	256.33	5256.61	-217.42	-1081.53	-210.81	1.52
5495.00	11.76	252.58	5340.54	-222.41	-1099.60	-215.69	2.16
5580.00	12.23	256.02	5423.68	-227.18	-1116.60	-220.35	1.01
5666.00	11.12	258.03	5507.90	-231.10	-1133.55	-224.17	1.37
5751.00	9.41	258.66	5591.54	-234.16	-1148.38	-227.14	2.02
5836.00	7.94	260.55	5675.56	-236.49	-1160.99	-229.40	1.76
5922.00	6.67	261.60	5760.86	-238.20	-1171.79	-231.04	1.48
6007.00	6.13	263.34	5845.33	-239.45	-1181.18	-232.23	0.67
6093.00	4.90	265.48	5930.93	-240.27	-1189.40	-233.00	1.45
6178.00	4.10	268.69	6015.67	-240.62	-1196.06	-233.31	0.99
6263.00	3.39	271.23	6100.49	-240.64	-1201.61	-233.30	0.86
6349.00	3.31	281.24	6186.34	-240.10	-1206.59	-232.73	0.69
6434.00	0.97	276.72	6271.28	-239.54	-1209.71	-232.14	2.76
6519.00	0.88	286.49	6356.27	-239.27	-1211.05	-231.87	0.21
6605.00	1.05	307.10	6442.26	-238.61	-1212.31	-231.20	0.45
6689.00	0.31	6.99	6526.25	-237.92	-1212.90	-230.50	1.11
6775.00	1.75	95.50	6612.24	-237.81	-1211.56	-230.41	2.06
6860.00	0.38	50.47	6697.22	-237.76	-1210.05	-230.36	1.77
6946.00	0.78	19.45	6783.22	-237.02	-1209.64	-229.63	0.58
7031.00	0.70	11.30	6868.21	-235.97	-1209.34	-228.58	0.16
7116.00	0.87	10.92	6953.20	-234.83	-1209.12	-227.44	0.20
7201.00	0.84	17.30	7038.19	-233.60	-1208.81	-226.21	0.12
7259.00	0.72	17.90	7096.19	-232.84	-1208.57	-225.46	0.21
7291.00	0.74	7.25	7128.18	-232.45	-1208.48	-225.06	0.43
7376.00	8.14	9.92	7212.87	-225.97	-1207.38	-218.59	8.71
7462.00	16.11	358.51	7296.89	-208.01	-1206.64	-200.64	9.63
7547.00	23.07	357.43	7376.92	-179.55	-1207.69	-172.17	8.20
7632.00	29.49	356.59	7453.10	-141.99	-1209.68	-134.60	7.57
7718.00	35.97	357.54	7525.41	-95.57	-1212.03	-88.17	7.56
7803.00	43.06	1.47	7590.95	-41.55	-1212.36	-34.14	8.84
7888.00	53.39	3.11	7647.50	21.70	-1209.76	29.09	12.24
7974.00	59.52	357.64	7695.03	93.30	-1209.41	100.68	8.88
8059.00	66.83	355.27	7733.36	168.94	-1214.15	176.35	8.95
8144.00	77.66	359.40	7759.26	249.67	-1217.81	257.10	13.55
8221.00	83.76	2.73	7771.68	325.60	-1216.38	333.02	9.00
8293.00	89.88	1.97	7775.68	397.39	-1213.44	404.80	8.57

Depth (ft)	Inc (deg)	Azm (deg)	TVD (ft)	Well Head		Vsect (ft)	Dogleg (deg/100ft)
				NS (ft)	EW (ft)		
8378.00	92.03	1.68	7774.26	482.33	-1210.73	489.72	2.55
8464.00	91.05	1.93	7771.95	568.26	-1208.02	575.63	1.18
8549.00	92.28	1.40	7769.48	653.18	-1205.56	660.54	1.58
8634.00	91.60	0.92	7766.60	738.12	-1203.84	745.46	0.98
8720.00	90.25	359.18	7765.21	824.10	-1203.76	831.44	2.56
8805.00	91.60	0.30	7763.84	909.08	-1204.15	916.42	2.06
8891.00	90.12	359.14	7762.55	995.07	-1204.57	1002.41	2.19
8976.00	92.35	358.37	7760.72	1080.02	-1206.41	1087.37	2.78
9062.00	93.64	359.83	7756.22	1165.89	-1207.76	1173.25	2.26
9147.00	93.52	359.93	7750.92	1250.73	-1207.94	1258.08	0.18
9232.00	93.09	0.36	7746.02	1335.58	-1207.73	1342.94	0.71
9318.00	91.29	358.22	7742.73	1421.51	-1208.79	1428.86	3.25
9403.00	90.56	356.79	7741.36	1506.41	-1212.49	1513.79	1.89
9489.00	91.29	356.03	7739.97	1592.23	-1217.88	1599.64	1.23
9574.00	90.68	355.68	7738.51	1676.99	-1224.02	1684.44	0.83
9660.00	90.86	356.56	7737.35	1762.79	-1229.84	1770.27	1.04
9745.00	88.89	356.88	7737.54	1847.65	-1234.70	1855.15	2.35
9830.00	89.57	357.32	7738.68	1932.53	-1239.00	1940.06	0.95
9916.00	90.55	359.64	7738.59	2018.49	-1241.28	2026.04	2.93
10001.00	89.57	0.56	7738.50	2103.49	-1241.13	2111.03	1.58
10087.00	88.83	0.18	7739.70	2189.48	-1240.58	2197.01	0.97
10172.00	89.01	1.55	7741.30	2274.45	-1239.29	2281.98	1.63
10257.00	90.31	1.25	7741.81	2359.42	-1237.22	2366.94	1.57
10343.00	89.75	1.05	7741.76	2445.40	-1235.49	2452.91	0.69
10428.00	91.17	0.76	7741.08	2530.39	-1234.15	2537.88	1.71
10513.00	90.93	1.16	7739.52	2615.36	-1232.73	2622.84	0.55
10598.00	90.92	0.35	7738.15	2700.34	-1231.61	2707.82	0.95
10683.00	91.05	358.88	7736.69	2785.33	-1232.18	2792.80	1.74
10769.00	91.54	359.31	7734.75	2871.29	-1233.53	2878.77	0.76
10854.00	91.67	1.29	7732.36	2956.25	-1233.09	2963.73	2.33
10939.00	91.17	0.82	7730.26	3041.21	-1231.53	3048.68	0.81
11025.00	89.82	359.93	7729.51	3127.21	-1230.96	3134.67	1.88
11110.00	90.12	0.80	7729.56	3212.20	-1230.42	3219.66	1.08
11195.00	91.79	0.27	7728.14	3297.18	-1229.63	3304.63	2.06
11281.00	90.99	359.57	7726.06	3383.16	-1229.75	3390.61	1.24
11366.00	89.69	0.83	7725.55	3468.15	-1229.45	3475.60	2.13
11451.00	89.38	0.14	7726.24	3553.15	-1228.73	3560.58	0.89
11537.00	90.62	359.75	7726.24	3639.14	-1228.81	3646.58	1.51
11622.00	89.12	1.25	7726.43	3724.14	-1228.07	3731.57	2.50
11707.00	90.93	1.33	7726.40	3809.11	-1226.16	3816.53	2.13
11793.00	90.31	1.21	7725.47	3895.08	-1224.25	3902.49	0.73
11878.00	90.62	0.92	7724.78	3980.07	-1222.67	3987.46	0.50
11963.00	90.25	2.18	7724.13	4065.03	-1220.37	4072.41	1.54
12049.00	89.57	2.08	7724.27	4150.97	-1217.18	4158.33	0.80
12134.00	89.32	1.89	7725.09	4235.92	-1214.23	4243.25	0.37
12219.00	89.51	1.33	7725.96	4320.88	-1211.85	4328.20	0.70
12305.00	91.60	0.63	7725.13	4406.85	-1210.37	4414.17	2.56
12390.00	91.17	359.63	7723.07	4491.83	-1210.18	4499.14	1.28
12476.00	90.56	359.82	7721.77	4577.82	-1210.59	4585.13	0.74
12561.00	89.82	359.84	7721.49	4662.82	-1210.85	4670.13	0.87

Depth (ft)	Inc (deg)	Azm (deg)	TVD (ft)	Well Head		VSect (ft)	Dogleg (deg/100ft)
				NS (ft)	EW (ft)		
12646.00	91.15	0.01	7720.77	4747.81	-1210.96	4755.12	1.58
12732.00	90.09	358.78	7719.84	4833.80	-1211.87	4841.11	1.89
12801.00	89.57	358.92	7720.05	4902.78	-1213.25	4910.10	0.78
12858.00	89.57	358.92	7720.47	4959.77	-1214.33	4967.10	0.00

\*Weatherford surveys from 1054 ft MD to 12801 ft MD.\*

\*TD well at 12858 ft MD.\*

The total correction is 8.65 deg relative to True North.