



Minimum Curvature Calculation

Client: EOG Resources **Job #:** PB-161122
Well: Nautilus 16 State Com #703H **M.W.D. Operators:** Thomas Nawara / John Clark
County, ST: Lea County, NM **Directional Drillers:** Ken Smith / Matt Greer
Rig: H&P 651 **Tool Azimuth to Grid North:** 6.46
Lat / Long: 32° 2' 57.715 N / -103° 28' 49.746 W **Geomagnetic Model:** HDGM
API#: 30-025-43129 **Single or Multi-well Pad (# /total):** 2 of 2
RKB / GL: 3366' / 3341' **DSI Corrected Runs:**
Vertical Section Angle: 184.72

Survey #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	DLS
Tie In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gyro	95.97	0.55	322.11	95.97	-0.34	0.36	-0.28	0.57
Gyro	189.01	0.66	301.13	189.00	-0.91	0.99	-1.02	0.26
Gyro	282.05	0.86	288.21	282.04	-1.31	1.49	-2.14	0.28
Gyro	375.09	1.08	252.72	375.06	-1.14	1.45	-3.64	0.67
Gyro	468.13	1.25	265.23	468.08	-0.65	1.10	-5.49	0.33
Gyro	561.17	1.61	253.47	561.09	0.00	0.64	-7.75	0.50
Gyro	654.21	1.51	258.87	654.10	0.80	0.04	-10.21	0.19
Gyro	747.25	1.70	262.99	747.10	1.42	-0.37	-12.78	0.24
Gyro	828.25	1.56	259.44	828.07	1.95	-0.72	-15.06	0.21
1	976.00	2.11	260.73	975.74	3.14	-1.52	-19.72	0.37
2	1163.00	1.93	253.61	1162.63	5.11	-2.97	-26.14	0.16
3	1350.00	0.26	263.01	1349.59	6.33	-3.91	-29.58	0.90
4	1536.00	0.44	153.41	1535.59	7.02	-4.60	-29.68	0.31
5	1724.00	0.44	191.47	1723.58	8.36	-5.95	-29.50	0.15
6	1911.00	0.88	178.64	1910.57	10.50	-8.09	-29.61	0.25
7	2100.00	0.70	182.59	2099.55	13.10	-10.69	-29.62	0.10
8	2288.00	0.88	56.12	2287.54	13.34	-11.04	-28.48	0.75
9	2475.00	1.49	75.19	2474.50	11.63	-9.61	-24.94	0.38
10	2662.00	1.58	88.55	2661.43	10.54	-8.93	-20.01	0.20
11	2849.00	0.62	53.83	2848.40	9.60	-8.27	-16.61	0.60
12	3036.00	0.79	39.95	3035.39	7.89	-6.68	-14.97	0.13
13	3223.00	1.93	62.97	3222.33	5.18	-4.26	-11.34	0.66
14	3411.00	0.62	76.07	3410.28	3.19	-2.58	-7.53	0.71
15	3599.00	0.53	54.80	3598.27	2.30	-1.83	-5.83	0.12
16	3786.00	0.62	89.78	3785.26	1.66	-1.33	-4.11	0.19
17	3972.00	2.02	100.24	3971.21	1.89	-1.91	0.12	0.76
18	4159.00	1.23	150.42	4158.14	3.87	-4.24	4.35	0.83
19	4348.00	2.11	149.63	4347.06	8.39	-9.01	7.11	0.47
20	4533.00	0.88	341.59	4532.03	9.87	-10.60	8.39	1.61
21	4719.00	0.97	20.43	4718.00	7.04	-7.77	8.49	0.33
22	4905.00	2.20	52.60	4903.93	3.13	-4.12	11.87	0.79
23	5090.00	0.70	18.06	5088.87	-0.35	-0.89	15.04	0.90
24	5278.00	0.88	272.33	5276.86	-1.41	0.26	13.96	0.67
25	5465.00	1.14	295.44	5463.83	-2.01	1.12	10.84	0.26
26	5652.00	1.14	308.54	5650.79	-3.70	3.08	7.71	0.14
27	5839.00	4.04	308.01	5837.58	-8.35	8.29	1.06	1.55
28	6026.00	5.54	306.52	6023.93	-16.72	17.72	-11.38	0.80
29	6214.00	5.98	305.20	6210.98	-26.47	28.77	-26.68	0.24
30	6400.00	5.98	304.76	6395.96	-36.24	39.88	-42.56	0.02
31	6587.00	5.72	301.95	6581.99	-45.38	50.36	-58.47	0.21
32	6774.00	5.89	299.84	6768.03	-53.72	60.07	-74.70	0.15
33	6960.00	6.07	303.27	6953.02	-62.47	70.21	-91.20	0.22
34	7149.00	6.16	308.54	7140.95	-72.89	82.01	-107.48	0.30
35	7336.00	6.60	309.51	7326.79	-84.60	95.10	-123.62	0.24
36	7523.00	6.86	307.49	7512.50	-96.78	108.73	-140.77	0.19
37	7709.00	5.98	320.58	7697.34	-109.75	122.98	-155.74	0.92
38	7895.00	5.54	314.25	7882.40	-122.42	136.73	-168.33	0.42
39	8082.00	5.36	312.93	8068.56	-133.56	148.98	-181.19	0.12
40	8270.00	5.10	311.09	8255.77	-143.95	160.45	-193.91	0.16
41	8456.00	4.75	307.22	8441.09	-152.99	170.54	-206.28	0.26
42	8642.00	4.75	306.25	8626.45	-161.15	179.75	-218.62	0.04

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Survey #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	DLS
43	8829.00	4.66	304.32	8812.82	-168.96	188.61	-231.14	0.10
44	9012.00	5.01	317.07	8995.17	-178.01	198.66	-242.72	0.62
45	9200.00	4.84	317.59	9182.48	-188.94	210.52	-253.66	0.09
46	9386.00	4.84	316.45	9367.82	-199.50	222.00	-264.36	0.05
47	9573.00	4.75	318.82	9554.16	-210.14	233.55	-274.89	0.12
48	9759.00	4.66	320.23	9739.53	-220.89	245.15	-284.80	0.08
49	9946.00	4.75	313.55	9925.91	-231.16	256.33	-295.27	0.30
50	10133.00	5.01	324.98	10112.23	-242.29	268.35	-305.56	0.54
51	10319.00	5.01	328.84	10297.52	-255.12	281.95	-314.43	0.18
52	10506.00	4.57	314.43	10483.88	-266.50	294.15	-323.97	0.68
53	10694.00	4.04	313.02	10671.34	-275.39	303.91	-334.16	0.29
54	10881.00	4.92	312.50	10857.77	-284.38	313.83	-344.89	0.47
55	11067.00	4.84	317.42	11043.10	-294.59	324.99	-356.08	0.23
56	11254.00	4.48	313.99	11229.48	-304.56	335.87	-366.67	0.24
57	11442.00	4.57	312.14	11416.89	-313.76	346.00	-377.51	0.09
58	11463.00	4.66	311.62	11437.83	-314.78	347.13	-378.77	0.47
59	11643.00	6.16	338.42	11617.05	-327.83	360.97	-387.79	1.61
60	11830.00	5.10	333.50	11803.14	-343.93	377.73	-395.19	0.62
61	12018.00	3.17	345.19	11990.65	-355.98	390.24	-400.25	1.12
62	12206.00	0.53	301.68	12178.54	-361.28	395.72	-402.31	1.49
63	12300.00	0.26	251.67	12272.54	-361.39	395.88	-402.89	0.44
64	12394.00	0.70	157.54	12366.53	-360.79	395.29	-402.87	0.81
65	12425.00	2.11	169.94	12397.52	-360.07	394.55	-402.70	4.63
66	12488.00	5.28	178.55	12460.38	-356.07	390.51	-402.42	5.09
67	12518.00	9.15	181.98	12490.14	-352.31	386.74	-402.47	12.97
68	12581.00	17.59	185.76	12551.38	-337.77	372.24	-403.60	13.46
69	12628.00	24.80	187.69	12595.17	-320.80	355.38	-405.63	15.41
70	12675.00	31.22	187.51	12636.65	-298.77	333.51	-408.55	13.66
71	12722.00	39.22	184.53	12675.01	-271.69	306.58	-411.32	17.41
72	12769.00	47.04	183.82	12709.29	-239.59	274.56	-413.64	16.67
73	12815.00	55.57	183.65	12738.02	-203.73	238.76	-415.98	18.55
74	12862.00	63.05	182.59	12761.99	-163.35	198.44	-418.16	16.03
75	12909.00	68.24	181.63	12781.37	-120.60	155.66	-419.73	11.20
76	12956.00	74.04	180.48	12796.55	-76.23	111.21	-420.54	12.56
77	12987.00	79.40	180.04	12803.67	-46.16	81.05	-420.67	17.35
78	13050.00	89.60	179.96	12809.70	16.25	18.43	-420.67	16.19
79	13144.00	92.42	178.90	12808.05	109.83	-75.54	-419.74	3.20
80	13238.00	91.36	178.64	12804.95	203.27	-169.47	-417.72	1.16
81	13330.00	91.80	176.79	12802.41	294.54	-261.36	-414.06	2.07
82	13424.00	91.28	176.35	12799.88	387.56	-355.15	-408.43	0.72
83	13517.00	90.92	177.50	12798.10	479.68	-448.00	-403.45	1.30
84	13611.00	89.69	177.32	12797.60	572.91	-541.90	-399.20	1.32
85	13705.00	89.87	178.55	12797.96	666.25	-635.84	-395.81	1.32
86	13798.00	90.92	179.34	12797.32	758.78	-728.82	-394.10	1.41
87	13892.00	90.57	179.08	12796.09	852.33	-822.80	-392.80	0.46
88	13985.00	90.13	177.93	12795.53	944.78	-915.77	-390.38	1.32
89	14079.00	88.99	177.50	12796.25	1038.08	-1009.69	-386.63	1.30
90	14173.00	88.55	177.06	12798.27	1131.26	-1103.56	-382.17	0.66
91	14266.00	88.46	176.18	12800.69	1223.30	-1196.36	-376.69	0.95
92	14359.00	91.45	176.18	12800.77	1315.26	-1289.15	-370.49	3.22
93	14453.00	91.54	179.17	12798.31	1408.51	-1383.03	-366.68	3.18
94	14545.00	90.66	180.75	12796.55	1500.17	-1475.01	-366.62	1.97
95	14639.00	88.37	179.34	12797.34	1593.85	-1568.99	-366.69	2.86
96	14732.00	89.34	177.58	12799.20	1686.27	-1661.94	-364.19	2.16
97	14826.00	88.55	179.87	12800.93	1779.73	-1755.89	-362.10	2.58
98	14920.00	90.48	183.12	12801.73	1873.56	-1849.84	-364.55	4.02
99	15014.00	89.34	180.40	12801.87	1967.43	-1943.78	-367.44	3.14
100	15107.00	89.96	180.75	12802.44	2060.18	-2036.78	-368.37	0.77
101	15200.00	90.48	180.66	12802.09	2152.95	-2129.77	-369.52	0.57
102	15293.00	87.67	178.90	12803.59	2245.58	-2222.74	-369.16	3.57
103	15386.00	89.87	180.04	12805.58	2338.16	-2315.71	-368.30	2.66
104	15419.00	90.84	180.75	12805.38	2371.07	-2348.71	-368.53	3.64
105	15512.00	90.04	179.34	12804.66	2463.75	-2441.70	-368.60	1.74
106	15606.00	89.87	179.08	12804.74	2557.32	-2535.69	-367.31	0.33
107	15699.00	91.54	179.78	12803.59	2649.91	-2628.68	-366.38	1.95

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108	15792.00	90.66	177.93	12801.81	2742.40	-2721.64	-364.52	2.20
109	15885.00	89.87	177.58	12801.38	2834.72	-2814.56	-360.88	0.93
110	15979.00	90.04	178.46	12801.45	2928.07	-2908.51	-357.63	0.95
111	16073.00	90.92	177.93	12800.66	3021.46	-3002.46	-354.67	1.09
112	16165.00	89.78	178.20	12800.10	3112.84	-3094.40	-351.57	1.27
113	16258.00	90.57	183.47	12799.82	3205.59	-3187.36	-352.92	5.73
114	16353.00	90.40	182.33	12799.01	3300.53	-3282.23	-357.73	1.21
115	16446.00	90.40	181.01	12798.37	3393.40	-3375.19	-360.44	1.42
116	16540.00	90.92	179.87	12797.28	3487.13	-3469.18	-361.16	1.33
117	16634.00	90.31	180.13	12796.27	3580.80	-3563.17	-361.16	0.71
118	16728.00	88.02	179.69	12797.64	3674.46	-3657.15	-361.01	2.48
119	16822.00	89.96	182.15	12799.30	3768.22	-3751.11	-362.52	3.33
120	16915.00	91.71	182.07	12797.95	3861.11	-3844.04	-365.94	1.88
121	17008.00	91.45	181.98	12795.38	3953.98	-3936.94	-369.23	0.30
122	17102.00	90.22	180.92	12794.01	4047.81	-4030.90	-371.61	1.73
123	17195.00	90.04	178.81	12793.80	4140.47	-4123.90	-371.39	2.28
124	17288.00	88.81	180.04	12794.73	4233.06	-4216.88	-370.45	1.87
125	17382.00	91.01	179.87	12794.88	4326.73	-4310.88	-370.38	2.35
126	17476.00	90.92	178.46	12793.30	4420.28	-4404.85	-369.01	1.50
127	17569.00	92.51	177.67	12790.51	4512.61	-4497.75	-365.87	1.91
128	17641.00	89.08	175.12	12789.52	4583.82	-4569.59	-361.35	5.94
PTB	17688.00	89.08	175.12	12790.27	4630.16	-4616.41	-357.35	0.00