



# Precision

## Survey Report

<b>Client</b>	Bighorn Directional	<b>MWD Operator</b>	D. Rask/A. Skoog
<b>Well Name</b>	Pappenheim 6-62-23-0362BH	<b>Rig Name</b>	Nabors M-37
<b>Location</b>	Weld County, Colorado	<b>End Date</b>	7/30/2013
<b>Start Date</b>	7/22/2013	<b>Proposed Direction</b>	181.69

<b>SUR NUM</b>	<b>MD ft</b>	<b>INC °</b>	<b>AZM °</b>	<b>TVD ft</b>	<b>N-S ft</b>	<b>E-W ft</b>	<b>SECT ft</b>	<b>DLS °/100'</b>
<b>TIE IN</b>	740	0.12	237.09	739.99	0.70	2.25	-0.77	0.5
1	882	0.8	74.9	881.99	0.88	3.08	-0.97	0.6
2	1067	4.1	307.9	1066.84	5.28	-0.89	-5.25	2.5
3	1252	6.1	331.1	1251.12	17.95	-10.86	-17.63	1.5
4	1436	6.2	315.2	1434.08	33.56	-22.59	-32.88	0.9
5	1532	6.5	297.0	1529.50	39.71	-31.08	-38.78	2.1
6	1627	6.7	293.6	1623.87	44.37	-40.95	-43.14	0.5
7	1723	4.7	305.4	1719.39	48.89	-49.29	-47.42	2.4
8	1819	4.6	302.6	1815.07	53.24	-55.74	-51.58	0.3
9	1914	4.9	308.6	1909.75	57.83	-62.12	-55.97	0.6
10	2009	4.2	304.0	2004.45	62.30	-68.17	-60.27	0.8
11	2105	5.3	313.3	2100.12	67.31	-74.32	-65.09	1.4
12	2201	4.6	313.1	2195.76	72.98	-80.35	-70.58	0.7
13	2297	4.3	303.8	2291.47	77.61	-86.16	-75.04	0.8
14	2393	4.5	324.9	2387.20	82.70	-91.31	-79.97	1.7
15	2489	5.3	313.8	2482.85	88.85	-96.68	-85.96	1.3
16	2586	4.6	312.8	2579.48	94.59	-102.77	-91.52	0.7
17	2682	4.5	314.2	2675.18	99.83	-108.29	-96.60	0.2
18	2777	4.3	308.4	2769.90	104.64	-113.75	-101.24	0.5
19	2873	5.1	306.4	2865.58	109.41	-120.01	-105.82	0.9
20	2969	5.4	306.8	2961.18	114.65	-127.06	-110.85	0.3
21	3065	4.7	307.3	3056.80	119.74	-133.80	-115.74	0.7
22	3160	4.5	307.5	3151.50	124.36	-139.86	-120.19	0.2
23	3255	5.6	316.3	3246.13	129.98	-146.02	-125.62	1.4
24	3349	5.1	314.7	3339.72	136.24	-152.16	-131.69	0.6
25	3445	5.1	317.3	3435.34	142.38	-158.08	-137.65	0.2
26	3541	5.3	321.0	3530.94	148.96	-163.77	-144.06	0.4



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27	3637	5.3	320.0	3626.53	155.80	-169.41	-150.74	0.1
28	3733	3.8	318.2	3722.23	161.57	-174.38	-156.36	1.6
29	3828	3.1	319.3	3817.05	165.86	-178.15	-160.54	0.7
30	3923	1.8	331.8	3911.97	169.13	-180.53	-163.73	1.5
31	4019	0.2	74.8	4007.95	170.50	-181.08	-165.08	1.9
32	4115	0.2	45.9	4103.95	170.66	-180.80	-165.25	0.1
33	4212	0.3	344.8	4200.95	171.02	-180.74	-165.62	0.3
34	4307	0.4	290.6	4295.95	171.38	-181.12	-165.96	0.3
35	4403	1.0	310.8	4391.94	172.04	-182.07	-166.60	0.7
36	4497	1.4	312.8	4485.92	173.36	-183.53	-167.87	0.4
37	4592	1.1	225.4	4580.90	173.51	-185.03	-167.98	1.8
38	4687	0.8	256.7	4675.89	172.72	-186.33	-167.15	0.6
39	4783	1.0	267.4	4771.88	172.52	-187.82	-166.91	0.3
40	4879	1.1	277.6	4867.86	172.61	-189.57	-166.94	0.2
41	4974	1.1	278.7	4962.85	172.87	-191.37	-167.15	0.0
42	5070	1.0	288.3	5058.83	173.27	-193.08	-167.50	0.2
43	5165	0.9	296.8	5153.82	173.86	-194.53	-168.05	0.2
44	5262	1.1	292.9	5250.80	174.57	-196.07	-168.71	0.2
45	5359	0.9	299.9	5347.79	175.31	-197.59	-169.41	0.2
46	5455	0.9	283.4	5443.78	175.86	-198.97	-169.92	0.3
47	5550	0.8	302.8	5538.77	176.40	-200.26	-170.41	0.3
48	5647	0.4	301.9	5635.76	176.94	-201.11	-170.93	0.4
49	5680	0.6	325.1	5668.76	177.14	-201.31	-171.13	0.9
50	5712	1.3	250.5	5700.76	177.16	-201.75	-171.13	4.0
51	5744	3.8	197.8	5732.72	176.03	-202.41	-169.98	10.0
52	5776	6.9	183.6	5764.58	173.10	-202.86	-167.04	10.5
53	5807	9.4	178.5	5795.27	168.71	-202.91	-162.65	8.4



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54	5839	11.6	178.1	5826.73	162.88	-202.74	-156.83	6.9
55	5870	13.5	181.6	5856.99	156.15	-202.73	-150.10	6.6
56	5902	16.7	184.5	5887.88	147.83	-203.20	-141.77	10.3
57	5934	19.4	183.2	5918.30	137.94	-203.86	-131.87	8.5
58	5966	21.4	179.7	5948.29	126.79	-204.12	-120.72	7.3
59	5998	24.8	177.1	5977.72	114.25	-203.75	-108.19	11.1
60	6030	28.7	174.6	6006.30	99.89	-202.69	-93.87	12.7
61	6062	32.9	173.9	6033.78	83.59	-201.04	-77.63	13.2
62	6093	36.8	175.8	6059.21	65.95	-199.47	-60.04	13.1
63	6125	40.6	177.8	6084.18	45.98	-198.36	-40.11	12.5
64	6157	45.1	178.5	6107.64	24.24	-197.67	-18.39	14.1
65	6190	50.1	178.5	6129.88	-0.12	-197.03	5.93	15.2
66	6222	54.8	179.2	6149.38	-25.48	-196.52	31.26	14.8
67	6254	59.7	179.5	6166.69	-52.38	-196.22	58.14	15.3
68	6285	61.1	179.2	6182.00	-79.33	-195.92	85.07	4.6
69	6317	61.1	179.4	6197.46	-107.34	-195.57	113.06	0.5
70	6350	63.8	178.7	6212.72	-136.59	-195.09	142.29	8.4
71	6382	66.7	178.1	6226.12	-165.64	-194.27	171.30	9.2
72	6414	69.6	177.1	6238.03	-195.31	-193.03	200.92	9.5
73	6447	70.2	176.5	6249.37	-226.25	-191.30	231.80	2.5
74	6478	72.7	176.4	6259.23	-255.58	-189.48	261.06	8.1
75	6511	75.6	176.2	6268.24	-287.26	-187.43	292.66	8.8
76	6542	78.3	177.6	6275.24	-317.41	-185.80	322.75	9.8
77	6574	79.5	177.4	6281.40	-348.78	-184.43	354.07	3.8
78	6606	79.8	177.4	6287.15	-380.23	-183.00	385.46	0.9
79	6638	83.3	177.1	6291.85	-411.84	-181.48	417.01	11.0
80	6674	87.0	177.2	6294.90	-447.66	-179.70	452.77	10.3
81	6727	88.4	178.8	6297.02	-500.58	-177.85	505.61	4.0
82	6819	89.5	177.4	6298.71	-592.51	-174.80	597.41	1.9
83	6912	90.9	176.7	6298.38	-685.39	-170.01	690.10	1.7
84	7004	92.9	176.4	6295.33	-777.16	-164.48	781.68	2.2
85	7096	93.2	176.5	6290.44	-868.86	-158.79	873.16	0.3
86	7188	90.5	179.9	6287.47	-960.74	-155.91	964.92	4.7



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87	7285	89	180.2	6287.89	-1057.74	-155.99	1061.88	1.6
88	7381	89.4	181.1	6289.23	-1153.72	-157.08	1157.85	1.0
89	7476	86.5	181.3	6292.63	-1248.63	-159.07	1252.78	3.1
90	7572	88	180.8	6297.24	-1344.50	-160.82	1348.66	1.6
91	7668	91.7	179.4	6297.49	-1440.48	-160.99	1444.60	4.1
92	7763	90.3	179.9	6295.83	-1535.46	-160.41	1539.53	1.6
93	7859	90.6	178.5	6295.08	-1631.45	-159.07	1635.43	1.5
94	7954	90.4	177.2	6294.25	-1726.37	-155.51	1730.21	1.4
95	8048	90.4	177.2	6293.59	-1820.26	-150.92	1823.92	0.0
96	8144	90.8	178.1	6292.59	-1916.17	-146.98	1919.67	1.0
97	8239	90.7	178.5	6291.34	-2011.12	-144.16	2014.50	0.4
98	8335	89	180.9	6291.59	-2107.11	-143.66	2110.43	3.1
99	8431	90.4	180.4	6292.10	-2203.10	-144.75	2206.41	1.5
100	8527	91.5	179.5	6290.50	-2299.08	-144.66	2302.35	1.5
101	8623	92.1	180.6	6287.49	-2395.04	-144.75	2398.26	1.3
102	8718	90.8	180.1	6285.08	-2490.00	-145.33	2493.20	1.5
103	8814	92.2	179.4	6282.57	-2585.96	-144.91	2589.11	1.6
104	8910	90.6	179.4	6280.23	-2681.93	-143.90	2685.00	1.7
105	9005	88.5	180.4	6280.97	-2776.92	-143.74	2779.95	2.4
106	9101	88.6	180.4	6283.40	-2872.88	-144.41	2875.89	0.1
107	9195	87.4	179.7	6286.68	-2966.82	-144.49	2969.80	1.5
108	9291	89.2	180.1	6289.53	-3062.78	-144.32	3065.70	1.9
109	9386	92.3	180.2	6288.29	-3157.76	-144.57	3160.65	3.3
110	9482	91.2	180.1	6285.35	-3253.71	-144.82	3256.57	1.2
111	9578	90.6	179.9	6283.85	-3349.70	-144.82	3352.51	0.7
112	9674	91.2	178.7	6282.34	-3445.68	-143.65	3448.42	1.4
113	9769	92.1	177.8	6279.60	-3540.59	-140.75	3543.20	1.3
114	9865	90.8	177.9	6277.17	-3636.49	-137.15	3638.96	1.4
115	9961	84.9	177.8	6280.77	-3732.31	-133.55	3734.63	6.1
116	10057	83.8	176.9	6290.23	-3827.74	-129.14	3829.89	1.5
117	10154	87.1	177.8	6297.92	-3924.32	-124.67	3926.29	3.5
118	10250	89.1	177.4	6301.10	-4020.18	-120.65	4021.99	2.1
119	10346	90.7	176.9	6301.27	-4116.06	-115.88	4117.68	1.7



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120	10441	90.6	178.1	6300.19	-4210.96	-111.74	4212.42	1.3
121	10537	90.1	178.7	6299.61	-4306.92	-109.05	4308.26	0.8
122	10561	89.9	178.1	6299.61	-4330.91	-108.38	4332.22	2.6
PTB	10605	89.9	178.1	6299.68	-4374.88	-106.93	4376.13	0.0