



Job Number: 08312014  
 Company: NightHawk Production LLC  
 Lease/Well: BlackComb 5-14  
 Location: Limon,Co  
 Rig Name: Extreme 11  
 RKB: ☐  
 G.L. or M.S.L.: ☐

State/Country: Co  
 Declination: 12  
 Grid: ☐  
 File name: C:\WINSERVE\08312014.SVY  
 Date/Time: 11-Sep-14 / 09:41  
 Curve Name: BlackComb 5-14

### BlackComb 5-14

WINSERVE SURVEY CALCULATIONS  
 Minimum Curvature Method  
 Vertical Section Plane 303.29  
 Vertical Section Referenced to Wellhead  
 Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg FROM PROPOSAL		
							Distance FT	Direction Deg	Severity Deg/100	Left-Right FT	Up-Down FT
<b>Tie-In to Gyro</b>											
285.00	.70	123.73	284.99	-2.06	.81	-1.81	2.21	158.54	.00	-1.39 R	14.09 U
452.00	.50	125.20	451.98	-3.05	2.25	-3.56	3.79	143.51	.12	-1.65 R	10.12 U
666.00	.90	152.60	665.96	-5.08	3.79	-5.95	6.34	143.26	.24	-4.32 R	3.27 U
882.00	1.10	154.60	881.93	-8.46	5.46	-9.21	10.07	147.15	.09	-2.90 R	-3.07 D
1096.00	.60	123.30	1095.91	-10.93	7.28	-12.08	13.13	146.33	.31	-5.14 R	-6.79 D
1267.00	2.50	359.40	1266.86	-7.69	7.99	-10.90	11.09	133.91	1.68	-5.37 R	6.07 U
1481.00	3.70	333.20	1480.55	3.14	4.82	-2.31	5.76	56.92	.85	-5.60 R	-0.85 D
1654.00	5.80	324.70	1652.95	15.26	-2.74	10.67	15.51	349.81	1.28	-7.83 R	-10.90 D
1867.00	5.50	319.50	1864.92	31.81	-15.59	30.49	35.42	333.88	.28	-13.68 R	-17.61 D
2080.00	4.70	322.50	2077.07	46.49	-27.53	48.53	54.03	329.36	.40	-18.31 R	-19.69 D
2293.00	4.80	298.70	2289.36	57.70	-40.67	65.66	70.59	324.82	.92	-26.72 R	-9.06 D
2507.00	4.80	297.10	2502.61	66.07	-56.49	83.49	86.93	319.47	.06	-25.20 R	-7.68 D

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100	FROM PROPOSAL	
							Distance FT	Direction Deg		Left-Right FT	Up-Down FT
2721.00	4.90	295.90	2715.84	74.15	-72.68	101.45	103.83	315.57	.07	-23.15 R	-6.75 D
2934.00	4.80	293.40	2928.08	81.66	-89.04	119.25	120.82	312.52	.11	-20.63 R	-5.46 D
3147.00	4.70	296.80	3140.35	89.13	-105.01	136.70	137.74	310.32	.14	-17.65 R	-5.85 D
3360.00	4.30	300.70	3352.69	97.14	-119.67	153.35	154.13	309.07	.24	-15.78 R	-5.18 D
3574.00	3.90	296.60	3566.15	104.50	-133.07	168.59	169.20	308.14	.23	-14.51 R	-0.79 D
3787.00	3.30	290.80	3778.73	109.92	-145.28	181.77	182.18	307.11	.33	-11.23 R	5.47 U
4000.00	4.00	302.80	3991.30	116.12	-157.26	195.19	195.48	306.44	.48	-10.69 R	8.17 U
4214.00	3.30	300.10	4204.86	123.25	-168.86	208.80	209.06	306.13	.34	-9.61 R	13.68 U
4385.00	2.90	298.20	4375.61	127.76	-176.93	218.02	218.24	305.83	.24	-8.01 R	19.43 U
4598.00	2.20	294.30	4588.40	131.99	-185.40	227.43	227.59	305.45	.34	-5.21 R	22.02 U
4812.00	2.10	305.20	4802.25	135.94	-192.35	235.40	235.54	305.25	.20	-8.56 R	14.48 U
5025.00	2.00	291.90	5015.11	139.58	-198.99	242.95	243.06	305.05	.23	-5.90 R	8.54 U
5239.00	2.10	302.60	5228.98	143.09	-205.76	250.53	250.62	304.82	.18	-6.69 R	-0.30 D
5452.00	1.80	310.10	5441.85	147.34	-211.60	257.75	257.85	304.85	.18	-6.08 R	-8.39 D
5665.00	1.90	325.30	5654.74	152.40	-216.17	264.35	264.49	305.18	.23	-2.79 R	-16.45 D
5879.00	1.80	333.90	5868.63	158.34	-219.67	270.53	270.79	305.78	.14	0.23 R	-23.56 D
6092.00	1.10	346.50	6081.56	163.33	-221.62	274.90	275.30	306.39	.36	6.09 R	-28.24 D
6306.00	.70	114.20	6295.55	164.79	-220.91	275.11	275.60	306.72	.76	20.25 R	22.04 U
6519.00	.60	95.00	6508.54	164.16	-218.61	272.84	273.38	306.90	.11	25.94 R	11.81 U
6692.00	.60	106.60	6681.53	163.82	-216.84	271.17	271.77	307.07	.07	23.22 R	14.99 U
6905.00	.60	111.80	6894.52	163.09	-214.73	269.01	269.65	307.22	.03	21.86 R	14.81 U
7076.00	.60	123.40	7065.51	162.26	-213.16	267.24	267.89	307.28	.07	18.62 R	17.13 U
7290.00	.50	125.40	7279.50	161.10	-211.46	265.19	265.84	307.30	.05	18.05 R	15.71 U
7503.00	.70	125.60	7492.48	159.81	-209.64	262.96	263.61	307.32	.09	18.00 R	13.55 U
7716.00	.40	122.10	7705.47	158.66	-207.96	260.91	261.57	307.34	.14	18.71 R	10.38 U
7930.00	.50	123.80	7919.47	157.74	-206.55	259.23	259.89	307.37	.05	18.42 R	9.25 U
8143.00	.20	126.30	8132.46	157.00	-205.48	257.93	258.59	307.38	.14	18.04 R	8.74 U
8313.00	.70	296.14	8302.46	157.28	-206.17	258.67	259.31	307.34	.53	-19.24 R	-6.17 D
<b>Projection to Bit</b>											
8365.00	.70	296.14	8354.46	157.56	-206.74	259.30	259.94	307.31	.00	-19.24 R	-6.81 D