



Job Number: SVGJ-140188
 Company: PDC
 Lease/Well: Guttersen 23-17
 Location: Weld County, CO
 Rig Name: MS Slickline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.32°
 Grid: East To True North
 File name: S:\2014SU~1\PDC\GJ\GUTTER~1\2317.SVY
 Date/Time: 21-Feb-14 / 16:11
 Curve Name: Surface - 6800' M.D. (Rate Gyro)

MS SURVEY

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method

Vertical Section Plane .00

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 Severity Deg/100
							Distance FT	Direction Deg	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.35	86.42	100.00	.02	.30	.02	.31	86.42	.35
200.00	.39	129.76	200.00	-.18	.87	-.18	.89	101.64	.28
300.00	.40	44.10	300.00	-.15	1.38	-.15	1.38	96.08	.54
400.00	.20	213.73	400.00	-.04	1.52	-.04	1.52	91.54	.60
500.00	.57	9.95	499.99	.30	1.51	.30	1.54	78.63	.76
600.00	.77	340.05	599.99	1.43	1.37	1.43	1.98	43.82	.40
700.00	.48	15.24	699.98	2.46	1.25	2.46	2.76	26.90	.47
800.00	.83	3.25	799.97	3.59	1.40	3.59	3.85	21.31	.37
900.00	.35	24.22	899.97	4.59	1.57	4.59	4.85	18.84	.52

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
							Distance FT	Direction Deg	
1000.00	.70	57.73	999.97	5.19	2.21	5.19	5.64	23.03	.45
1100.00	.74	21.90	1099.96	6.12	2.97	6.12	6.80	25.85	.44
1200.00	.35	12.31	1199.95	7.02	3.27	7.02	7.74	24.99	.40
1300.00	.61	68.33	1299.95	7.51	3.83	7.51	8.43	27.02	.51
1400.00	.59	16.91	1399.95	8.20	4.48	8.20	9.34	28.62	.52
1500.00	.16	113.24	1499.94	8.64	4.75	8.64	9.86	28.82	.63
1600.00	.39	56.83	1599.94	8.77	5.17	8.77	10.18	30.50	.33
1700.00	.28	301.90	1699.94	9.09	5.24	9.09	10.49	29.99	.57
1800.00	.23	134.91	1799.94	9.07	5.18	9.07	10.45	29.72	.51
1900.00	.41	348.57	1899.94	9.28	5.25	9.28	10.66	29.49	.61
2000.00	.17	269.03	1999.94	9.63	5.03	9.63	10.87	27.58	.41
2100.00	.61	46.94	2099.94	9.99	5.27	9.99	11.30	27.82	.74
2200.00	.13	355.01	2199.94	10.47	5.65	10.47	11.90	28.36	.54
2300.00	.65	92.16	2299.93	10.56	6.21	10.56	12.25	30.45	.68
2400.00	.46	62.95	2399.93	10.72	7.13	10.72	12.88	33.63	.33
2500.00	.22	92.70	2499.93	10.89	7.68	10.89	13.33	35.19	.29
2600.00	.55	144.36	2599.92	10.49	8.15	10.49	13.29	37.84	.45
2700.00	.63	88.28	2699.92	10.12	8.98	10.12	13.53	41.59	.56
2800.00	.45	142.87	2799.92	9.82	9.77	9.82	13.85	44.83	.52
2900.00	1.06	127.74	2899.91	8.95	10.74	8.95	13.97	50.20	.64
3000.00	1.42	149.52	2999.88	7.31	12.10	7.31	14.13	58.85	.59
3100.00	1.68	140.62	3099.85	5.11	13.66	5.11	14.58	69.48	.35
3200.00	1.01	150.33	3199.82	3.21	15.02	3.21	15.36	77.93	.71
3300.00	1.34	173.94	3299.80	1.28	15.58	1.28	15.63	85.29	.58
3400.00	1.17	154.69	3399.78	-8.0	16.14	-8.0	16.16	92.85	.45
3500.00	.67	137.30	3499.76	-2.16	16.97	-2.16	17.11	97.24	.57
3600.00	1.00	132.99	3599.75	-3.18	18.01	-3.18	18.29	100.01	.34
3700.00	.92	101.88	3699.74	-3.94	19.43	-3.94	19.83	101.46	.52
3800.00	.57	120.72	3799.73	-4.36	20.65	-4.36	21.10	101.92	.42

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
							Distance FT	Direction Deg	
3900.00	.71	139.39	3899.72	-5.08	21.48	-5.08	22.07	103.32	.25
4000.00	.60	144.97	3999.72	-5.98	22.18	-5.98	22.97	105.10	.13
4100.00	.63	122.10	4099.71	-6.70	22.95	-6.70	23.91	106.29	.25
4200.00	.23	248.78	4199.71	-7.07	23.23	-7.07	24.28	106.93	.79
4300.00	.69	248.93	4299.71	-7.36	22.48	-7.36	23.65	108.13	.46
4400.00	.61	224.67	4399.70	-7.95	21.54	-7.95	22.96	110.26	.28
4500.00	.46	279.88	4499.70	-8.26	20.77	-8.26	22.35	111.69	.51
4600.00	1.13	285.03	4599.69	-7.94	19.42	-7.94	20.98	112.23	.67
4700.00	.75	273.32	4699.67	-7.64	17.82	-7.64	19.39	113.22	.42
4800.00	1.24	305.13	4799.66	-6.98	16.28	-6.98	17.71	113.22	.72
4900.00	1.16	286.48	4899.64	-6.07	14.42	-6.07	15.65	112.84	.40
5000.00	.85	305.41	4999.62	-5.36	12.85	-5.36	13.92	112.63	.45
5100.00	1.39	299.25	5099.60	-4.33	11.19	-4.33	12.00	111.18	.55
5200.00	.64	293.45	5199.59	-3.52	9.61	-3.52	10.24	110.11	.76
5300.00	1.06	293.47	5299.57	-2.93	8.25	-2.93	8.76	109.54	.42
5400.00	.58	299.92	5399.56	-2.31	6.97	-2.31	7.34	108.33	.49
5500.00	.91	317.30	5499.56	-1.47	5.99	-1.47	6.17	103.81	.40
5600.00	.24	296.23	5599.55	-.80	5.26	-.80	5.32	98.60	.69
5700.00	.54	333.78	5699.55	-.28	4.87	-.28	4.88	93.30	.38
5800.00	.13	153.26	5799.55	.04	4.71	.04	4.71	89.51	.67
5900.00	.36	18.18	5899.55	.24	4.86	.24	4.87	87.20	.46
6000.00	.15	182.45	5999.54	.41	4.95	.41	4.97	85.32	.51
6100.00	.33	46.52	6099.54	.47	5.16	.47	5.18	84.76	.45
6200.00	.20	260.05	6199.54	.64	5.19	.64	5.23	82.96	.51
6300.00	.20	147.46	6299.54	.46	5.11	.46	5.14	84.82	.33
6400.00	.37	61.68	6399.54	.47	5.49	.47	5.51	85.11	.41
6500.00	.25	251.67	6499.54	.55	5.57	.55	5.60	84.32	.62
6600.00	.32	56.71	6599.54	.64	5.60	.64	5.63	83.49	.57
6700.00	.26	213.15	6699.54	.60	5.70	.60	5.74	83.97	.57

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
							Distance FT	Direction Deg	
Last Survey Depth Recorded									
6800.00	.48	26.87	6799.54	.79	5.77	.79	5.82	82.24	.74