



Job Number: SVGJ-120879
 Company: PDC
 Lease/Well: State Lease 81 23-16
 Location: Weld County, CO
 Rig Name: MS Wireline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.60°
 Grid: East To True North
 File name: F:\SURVEY\2012SU~1\PDC\LORENZ\STATEL~1\812316.SVY
 Date/Time: 12-Sep-12 / 11:03
 Curve Name: Surface - 6900' M.D. (Rate Gyro)

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane .00
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

We hereby certify that our survey data from
 Surface MD to 6900' MD is, to the best of
 our knowledge a true and accurate account of
 the well bore.
 Mark Simmons 9/12/12
 MS Energy Services Date

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.58	18.62	100.00	.48	.16	.48	.51	18.62	.58
200.00	.22	88.87	200.00	.96	.52	.96	1.09	28.14	.55
300.00	.19	345.02	300.00	1.13	.66	1.13	1.31	30.51	.32
400.00	.47	285.85	399.99	1.40	.23	1.40	1.42	9.21	.41
500.00	.24	323.82	499.99	1.68	-.29	1.68	1.71	350.16	.32
600.00	.10	240.66	599.99	1.81	-.49	1.81	1.87	344.79	.25
700.00	.31	317.26	699.99	1.96	-.75	1.96	2.10	339.07	.30
800.00	.10	112.56	799.99	2.13	-.85	2.13	2.29	338.14	.40
900.00	.09	358.24	899.99	2.17	-.78	2.17	2.31	340.36	.16

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
1000.00	.19	303.13	999.99	2.34	-.92	2.34	2.51	338.62	.16
1100.00	.17	137.00	1099.99	2.32	-.95	2.32	2.51	337.67	.36
1200.00	.23	213.40	1199.99	2.05	-.96	2.05	2.26	334.80	.25
1300.00	.25	271.95	1299.99	1.89	-1.29	1.89	2.29	325.61	.24
1400.00	.31	339.32	1399.99	2.15	-1.61	2.15	2.68	323.22	.31
1500.00	.27	17.40	1499.99	2.63	-1.63	2.63	3.09	328.16	.19
1600.00	.16	69.64	1599.99	2.90	-1.43	2.90	3.23	333.76	.21
1700.00	.09	173.72	1699.99	2.87	-1.29	2.87	3.15	335.80	.20
1800.00	.17	269.26	1799.99	2.79	-1.43	2.79	3.14	332.87	.20
1900.00	.18	348.89	1899.99	2.94	-1.61	2.94	3.35	331.34	.22
2000.00	.35	61.74	1999.98	3.24	-1.37	3.24	3.52	337.09	.34
2100.00	.79	106.04	2099.98	3.20	-.44	3.20	3.23	352.19	.59
2200.00	1.26	124.21	2199.96	2.39	1.13	2.39	2.64	25.41	.57
2300.00	1.33	133.54	2299.94	.97	2.88	.97	3.04	71.43	.22
2400.00	1.27	140.90	2399.91	-.69	4.42	-.69	4.48	98.87	.18
2500.00	1.04	153.13	2499.89	-2.36	5.53	-2.36	6.02	113.10	.34
2600.00	.90	158.73	2599.88	-3.90	6.23	-3.90	7.35	122.06	.17
2700.00	.73	170.64	2699.87	-5.26	6.62	-5.26	8.45	128.49	.24
2800.00	.66	174.88	2799.86	-6.46	6.77	-6.46	9.36	133.67	.09
2900.00	.63	175.29	2899.85	-7.59	6.87	-7.59	10.23	137.84	.03
3000.00	.58	173.36	2999.85	-8.64	6.97	-8.64	11.10	141.09	.05
3100.00	.54	155.85	3099.84	-9.57	7.22	-9.57	11.99	142.95	.17
3200.00	.85	140.20	3199.84	-10.57	7.89	-10.57	13.19	143.25	.36
3300.00	1.25	139.98	3299.82	-11.97	9.07	-11.97	15.02	142.87	.40
3400.00	1.37	160.02	3399.79	-13.93	10.18	-13.93	17.25	143.85	.47
3500.00	1.78	161.28	3499.76	-16.53	11.08	-16.53	19.90	146.15	.41
3600.00	1.71	182.71	3599.71	-19.49	11.51	-19.49	22.63	149.43	.65
3700.00	1.51	189.05	3699.67	-22.28	11.23	-22.28	24.95	153.24	.27
3800.00	1.80	185.69	3799.63	-25.14	10.87	-25.14	27.39	156.62	.31

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	1.84	187.65	3899.58	-28.30	10.50	-28.30	30.18	159.64	.07
4000.00	1.62	184.31	3999.53	-31.30	10.18	-31.30	32.91	161.98	.24
4100.00	1.49	183.53	4099.50	-34.01	10.00	-34.01	35.44	163.62	.13
4200.00	1.14	184.28	4199.47	-36.30	9.84	-36.30	37.61	164.83	.35
4300.00	1.27	191.25	4299.45	-38.37	9.55	-38.37	39.55	166.02	.20
4400.00	1.60	177.43	4399.42	-40.86	9.40	-40.86	41.92	167.05	.48
4500.00	1.88	182.00	4499.37	-43.89	9.40	-43.89	44.89	167.91	.31
4600.00	2.40	182.22	4599.30	-47.62	9.26	-47.62	48.51	168.99	.52
4700.00	1.75	203.43	4699.24	-51.11	8.58	-51.11	51.83	170.48	1.00
4800.00	1.56	241.56	4799.20	-53.16	6.77	-53.16	53.59	172.74	1.10
4900.00	2.18	278.55	4899.15	-53.53	3.69	-53.53	53.66	176.05	1.32
5000.00	2.75	280.04	4999.05	-52.83	-.55	-52.83	52.83	180.60	.57
5100.00	2.99	285.84	5098.93	-51.70	-5.42	-51.70	51.98	185.99	.38
5200.00	3.02	294.49	5198.79	-49.89	-10.33	-49.89	50.95	191.69	.45
5300.00	2.41	298.08	5298.68	-47.81	-14.58	-47.81	49.99	196.96	.63
5400.00	1.82	295.32	5398.61	-46.14	-17.87	-46.14	49.48	201.17	.60
5500.00	1.62	302.32	5498.57	-44.71	-20.50	-44.71	49.18	204.63	.29
5600.00	1.43	318.38	5598.53	-43.02	-22.52	-43.02	48.56	207.63	.47
5700.00	1.13	333.20	5698.51	-41.21	-23.80	-41.21	47.59	210.00	.44
5800.00	1.09	338.01	5798.49	-39.45	-24.60	-39.45	46.49	211.95	.10
5900.00	.84	353.51	5898.47	-37.84	-25.04	-37.84	45.37	213.49	.36
6000.00	1.26	359.67	5998.46	-36.01	-25.12	-36.01	43.91	214.91	.43
6100.00	1.10	5.20	6098.43	-33.95	-25.04	-33.95	42.19	216.41	.20
6200.00	1.45	8.13	6198.41	-31.74	-24.78	-31.74	40.27	217.97	.36
6300.00	1.75	4.76	6298.37	-28.97	-24.47	-28.97	37.92	220.19	.31
6400.00	2.12	2.92	6398.31	-25.60	-24.25	-25.60	35.26	223.45	.38
6500.00	1.76	359.50	6498.26	-22.22	-24.17	-22.22	32.83	227.41	.38
6600.00	.85	349.02	6598.23	-19.95	-24.33	-19.95	31.46	230.64	.94
6700.00	.04	354.72	6698.23	-19.19	-24.47	-19.19	31.10	231.89	.81

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	
6800.00	.53	197.83	6798.22	-19.60	-24.61	-19.60	31.46	231.48	.57
Last Survey Depth Recorded									
6900.00	.28	156.70	6898.22	-20.26	-24.66	-20.26	31.92	230.59	.37