



Job Number: SVGJ-120543
 Company: PDC
 Lease/Well: Wells Ranch 13-20
 Location: Weld County, CO
 Rig Name: MS Energy Wireline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.58°
 Grid: East To True North
 File name: F:\SURVEY\2012SU~1\PDC\LORENZ\WELLSR~1\13-20.SVY
 Date/Time: 15-May-12 / 10:00
 Curve Name: Surface - 6700' M.D. (Rate Gyro)

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	.27	30.38	100.00	.20	.12	.20	.24	30.38	.27
200.00	.20	313.17	200.00	.53	.11	.53	.54	11.92	.30
300.00	.17	91.34	300.00	.64	.13	.64	.66	11.63	.35
400.00	.50	349.63	400.00	1.07	.20	1.07	1.09	10.71	.56
500.00	.30	287.48	500.00	1.58	-.13	1.58	1.58	355.41	.45
600.00	.39	29.49	599.99	1.95	-.21	1.95	1.96	353.90	.54
700.00	.55	321.05	699.99	2.62	-.34	2.62	2.64	352.55	.54
800.00	.51	26.22	799.99	3.39	-.45	3.39	3.42	352.48	.57
900.00	.02	274.64	899.99	3.79	-.27	3.79	3.80	355.95	.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	.57	350.18	999.99	4.28	-.37	4.28	4.30	355.05	.57
1100.00	.29	54.98	1099.98	4.92	-.25	4.92	4.93	357.11	.52
1200.00	.63	342.77	1199.98	5.59	-.20	5.59	5.59	357.91	.61
1300.00	.67	14.07	1299.97	6.68	-.22	6.68	6.69	358.07	.35
1400.00	.18	5.19	1399.97	7.41	-.07	7.41	7.41	359.47	.49
1500.00	.34	296.19	1499.97	7.69	-.32	7.69	7.70	357.62	.32
1600.00	.82	297.67	1599.96	8.16	-1.22	8.16	8.25	351.49	.48
1700.00	.83	286.66	1699.95	8.70	-2.55	8.70	9.06	343.67	.16
1800.00	.26	295.08	1799.95	9.00	-3.45	9.00	9.64	339.04	.57
1900.00	.10	246.09	1899.95	9.06	-3.73	9.06	9.80	337.61	.21
2000.00	.19	15.12	1999.95	9.19	-3.77	9.19	9.93	337.69	.26
2100.00	.27	103.34	2099.95	9.29	-3.50	9.29	9.93	339.38	.33
2200.00	.82	58.47	2199.94	9.61	-2.66	9.61	9.97	344.54	.66
2300.00	.90	52.52	2299.93	10.46	-1.42	10.46	10.56	352.25	.12
2400.00	1.05	34.73	2399.92	11.69	-.28	11.69	11.70	358.63	.34
2500.00	1.11	37.92	2499.90	13.21	.84	13.21	13.24	3.63	.08
2600.00	.87	16.24	2599.89	14.70	1.65	14.70	14.80	6.39	.44
2700.00	.98	356.03	2699.87	16.29	1.80	16.29	16.39	6.30	.34
2800.00	.94	20.29	2799.86	17.91	2.02	17.91	18.02	6.45	.41
2900.00	1.50	347.74	2899.84	19.96	2.03	19.96	20.06	5.81	.87
3000.00	1.17	354.84	2999.81	22.25	1.66	22.25	22.32	4.27	.37
3100.00	1.48	330.76	3099.78	24.40	.94	24.40	24.42	2.20	.63
3200.00	.63	352.43	3199.77	26.07	.23	26.07	26.07	.52	.92
3300.00	1.02	146.86	3299.76	25.87	.65	25.87	25.88	1.44	1.61
3400.00	2.26	165.08	3399.72	23.22	1.64	23.22	23.28	4.05	1.33
3500.00	2.42	144.00	3499.64	19.60	3.39	19.60	19.90	9.82	.87
3600.00	2.46	134.70	3599.55	16.39	6.16	16.39	17.51	20.60	.40
3700.00	2.11	136.00	3699.47	13.55	8.96	13.55	16.25	33.48	.35
3800.00	2.48	146.61	3799.39	10.42	11.43	10.42	15.47	47.65	.56

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	2.35	145.40	3899.30	6.93	13.79	6.93	15.43	63.32	.14
4000.00	1.64	135.29	3999.24	4.22	15.96	4.22	16.51	75.17	.79
4100.00	1.23	148.64	4099.21	2.29	17.52	2.29	17.67	82.55	.53
4200.00	.94	155.66	4199.19	.63	18.42	.63	18.43	88.05	.32
4300.00	.88	189.18	4299.18	-.88	18.64	-.88	18.66	92.70	.53
4400.00	.56	241.47	4399.17	-1.87	18.08	-1.87	18.18	95.90	.70
4500.00	1.19	268.19	4499.16	-2.14	16.62	-2.14	16.75	97.33	.73
4600.00	2.06	300.37	4599.12	-1.26	14.03	-1.26	14.08	95.14	1.23
4700.00	1.94	304.42	4699.06	.60	11.08	.60	11.10	86.88	.19
4800.00	2.44	316.33	4798.99	3.10	8.21	3.10	8.78	69.32	.67
4900.00	1.92	321.28	4898.91	5.95	5.70	5.95	8.24	43.76	.55
5000.00	1.48	314.55	4998.87	8.16	3.73	8.16	8.97	24.56	.48
5100.00	.99	293.72	5098.85	9.41	2.02	9.41	9.63	12.10	.66
5200.00	.92	289.16	5198.83	10.03	.47	10.03	10.04	2.67	.10
5300.00	.99	283.27	5298.82	10.49	-1.13	10.49	10.55	353.84	.12
5400.00	1.62	301.82	5398.79	11.43	-3.17	11.43	11.86	344.49	.75
5500.00	.93	301.74	5498.77	12.60	-5.06	12.60	13.58	338.11	.69
5600.00	1.09	322.56	5598.75	13.79	-6.33	13.79	15.17	335.33	.40
5700.00	.84	333.33	5698.74	15.20	-7.24	15.20	16.83	334.52	.31
5800.00	1.13	333.74	5798.72	16.73	-8.01	16.73	18.55	334.44	.29
5900.00	.93	342.64	5898.71	18.39	-8.68	18.39	20.34	334.73	.26
6000.00	1.01	334.82	5998.69	19.97	-9.30	19.97	22.03	335.02	.15
6100.00	.38	332.84	6098.68	21.06	-9.83	21.06	23.24	334.98	.63
6200.00	.58	353.85	6198.68	21.86	-10.03	21.86	24.05	335.34	.26
6300.00	.31	322.95	6298.68	22.58	-10.25	22.58	24.79	335.58	.35
6400.00	.39	271.46	6398.68	22.80	-10.75	22.80	25.21	334.75	.31
6500.00	.53	349.67	6498.67	23.26	-11.18	23.26	25.81	334.34	.59
6600.00	.16	222.91	6598.67	23.62	-11.35	23.62	26.20	334.32	.64

Last Survey Depth Recorded

6700.00	.23	248.47	6698.67	23.44	Page 3 -11.64	23.44	26.17	333.60	.11
---------	-----	--------	---------	-------	---------------	-------	-------	--------	-----