



Job Number: SVGJ-120979  
 Company: PDC  
 Lease/Well: Magnusson 1-23  
 Location: Weld County, CO  
 Rig Name: BWS  
 RKB: 6'  
 G.L. or M.S.L.: GL

State/Country: Colorado/USA  
 Declination: 8.69°  
 Grid: East To True North  
 File name: F:\SURVEY\2012SU-1\PDC\LORENZ\MAGNUS-1\1-23.SVY  
 Date/Time: 05-Oct-12 / 10:25  
 Curve Name: Surface - 7400' 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

<i>Measured Depth FT</i>	<i>Incl Angle Deg</i>	<i>Drift Direction Deg</i>	<i>True Vertical Depth</i>	<i>N-S FT</i>	<i>E-W FT</i>	<i>Vertical Section FT</i>	<i>C L O S U R E Distance FT</i>	<i>Direction Deg</i>	<i>Dogleg Severity Deg/100</i>
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.55	204.45	100.00	-.44	-.20	-.44	.48	204.45	.55
200.00	.20	220.21	200.00	-1.01	-.51	-1.01	1.13	206.86	.36
300.00	.17	146.13	300.00	-1.26	-.54	-1.26	1.37	203.14	.22
400.00	.13	156.94	400.00	-1.49	-.41	-1.49	1.55	195.48	.05
500.00	.16	139.91	500.00	-1.70	-.28	-1.70	1.72	189.29	.05
600.00	.08	197.54	599.99	-1.88	-.21	-1.88	1.89	186.38	.14
700.00	.12	170.65	699.99	-2.05	-.21	-2.05	2.06	185.96	.06
800.00	.08	158.13	799.99	-2.21	-.17	-2.21	2.22	184.41	.05
900.00	.14	161.41	899.99	-2.39	-.11	-2.39	2.40	182.53	.06

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	.08	161.90	999.99	-2.58	-.05	-2.58	2.58	181.00	.06
1100.00	.08	220.91	1099.99	-2.70	-.07	-2.70	2.70	181.47	.08
1200.00	.32	233.77	1199.99	-2.91	-.34	-2.91	2.93	186.66	.24
1300.00	.08	169.09	1299.99	-3.15	-.55	-3.15	3.20	189.95	.29
1400.00	.20	207.12	1399.99	-3.37	-.62	-3.37	3.43	190.40	.15
1500.00	.18	217.33	1499.99	-3.65	-.79	-3.65	3.74	192.26	.04
1600.00	.19	205.88	1599.99	-3.93	-.96	-3.93	4.04	193.76	.04
1700.00	.26	216.98	1699.99	-4.26	-1.17	-4.26	4.41	195.37	.08
1800.00	.49	215.33	1799.99	-4.79	-1.55	-4.79	5.03	197.98	.23
1900.00	.59	213.88	1899.98	-5.56	-2.09	-5.56	5.94	200.57	.10
2000.00	.80	221.84	1999.98	-6.51	-2.84	-6.51	7.10	203.57	.23
2100.00	.79	226.74	2099.97	-7.50	-3.81	-7.50	8.41	206.91	.07
2200.00	.79	226.01	2199.96	-8.45	-4.81	-8.45	9.72	209.62	.01
2300.00	.74	227.94	2299.95	-9.36	-5.78	-9.36	11.01	211.69	.06
2400.00	.80	235.95	2399.94	-10.19	-6.84	-10.19	12.27	213.87	.12
2500.00	.83	247.59	2499.93	-10.86	-8.09	-10.86	13.54	216.69	.17
2600.00	.87	260.21	2599.92	-11.26	-9.51	-11.26	14.74	220.17	.19
2700.00	.92	264.77	2699.91	-11.46	-11.05	-11.46	15.92	223.96	.09
2800.00	.93	267.68	2799.89	-11.57	-12.66	-11.57	17.15	227.59	.05
2900.00	.97	269.24	2899.88	-11.61	-14.32	-11.61	18.44	230.96	.05
3000.00	.95	272.40	2999.87	-11.59	-16.00	-11.59	19.75	234.07	.06
3100.00	.84	283.93	3099.85	-11.38	-17.53	-11.38	20.90	237.02	.21
3200.00	.81	290.23	3199.84	-10.96	-18.91	-10.96	21.85	239.91	.10
3300.00	.68	289.58	3299.83	-10.51	-20.13	-10.51	22.71	242.42	.13
3400.00	.60	287.32	3399.83	-10.16	-21.19	-10.16	23.50	244.39	.08
3500.00	.48	289.97	3499.82	-9.86	-22.08	-9.86	24.19	245.94	.12
3600.00	.26	290.05	3599.82	-9.64	-22.69	-9.64	24.65	246.98	.22
3700.00	.16	197.29	3699.82	-9.70	-22.95	-9.70	24.91	247.09	.31
3800.00	.42	183.83	3799.82	-10.19	-23.01	-10.19	25.17	246.11	.27
3900.00	.62	185.51	3899.82	-11.10	-23.09	-11.10	25.62	244.33	.20

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	
4000.00	.77	190.15	3999.81	-12.30	-23.26	-12.30	26.31	242.13	.16
4100.00	.90	190.28	4099.80	-13.73	-23.52	-13.73	27.23	239.72	.13
4200.00	.92	192.11	4199.79	-15.29	-23.83	-15.29	28.31	237.31	.04
4300.00	.92	203.81	4299.77	-16.81	-24.32	-16.81	29.56	235.35	.19
4400.00	.94	209.82	4399.76	-18.26	-25.05	-18.26	31.00	233.92	.10
4500.00	.87	215.46	4499.75	-19.59	-25.90	-19.59	32.47	232.90	.11
4600.00	.82	216.25	4599.74	-20.78	-26.76	-20.78	33.88	232.17	.05
4700.00	.84	219.15	4699.73	-21.93	-27.65	-21.93	35.29	231.58	.05
4800.00	.72	219.02	4799.72	-22.98	-28.51	-22.98	36.62	231.12	.12
4900.00	.75	215.78	4899.71	-24.00	-29.28	-24.00	37.86	230.66	.05
5000.00	.99	192.55	4999.70	-25.38	-29.85	-25.38	39.18	229.64	.42
5100.00	1.03	191.06	5099.68	-27.10	-30.22	-27.10	40.59	228.11	.05
5200.00	1.06	191.95	5199.66	-28.89	-30.58	-28.89	42.07	226.63	.03
5300.00	.94	197.43	5299.65	-30.58	-31.02	-30.58	43.55	225.41	.15
5400.00	.85	204.04	5399.64	-32.04	-31.56	-32.04	44.97	224.57	.14
5500.00	.69	211.90	5499.63	-33.23	-32.18	-33.23	46.26	224.09	.19
5600.00	.74	214.34	5599.62	-34.27	-32.87	-34.27	47.48	223.80	.06
5700.00	.64	226.17	5699.61	-35.19	-33.63	-35.19	48.68	223.71	.17
5800.00	.54	264.09	5799.61	-35.62	-34.51	-35.62	49.60	224.09	.39
5900.00	.49	275.78	5899.60	-35.63	-35.40	-35.63	50.23	224.81	.12
6000.00	.43	290.43	5999.60	-35.46	-36.18	-35.46	50.65	225.58	.13
6100.00	.48	298.22	6099.60	-35.13	-36.90	-35.13	50.94	226.41	.08
6200.00	.50	309.65	6199.59	-34.65	-37.60	-34.65	51.13	227.34	.10
6300.00	.48	304.41	6299.59	-34.14	-38.28	-34.14	51.29	228.28	.05
6400.00	.49	310.62	6399.59	-33.62	-38.95	-33.62	51.46	229.20	.05
6500.00	.52	314.75	6499.58	-33.02	-39.60	-33.02	51.56	230.18	.05
6600.00	.53	312.46	6599.58	-32.39	-40.26	-32.39	51.68	231.19	.02
6700.00	.52	300.27	6699.57	-31.85	-41.00	-31.85	51.92	232.16	.11
6800.00	.63	294.58	6799.57	-31.39	-41.89	-31.39	52.35	233.15	.12
6900.00	.71	292.20	6899.56	-30.93	-42.96	-30.93	52.94	234.25	.08

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	
7000.00	.67	282.17	6999.56	-30.57	-44.11	-30.57	53.67	235.27	.13
7100.00	.71	288.65	7099.55	-30.25	-45.27	-30.25	54.44	236.25	.09
7200.00	.76	284.42	7199.54	-29.89	-46.50	-29.89	55.27	237.27	.07
7300.00	1.26	227.64	7299.53	-30.46	-47.95	-30.46	56.81	237.57	1.06
Last Survey Depth Recorded									
7400.00	1.44	234.88	7399.50	-31.93	-49.79	-31.93	59.15	237.33	.25