



Job Number: SVGJ-141357
 Company: PDC
 Lease/Well: National Hog Farm 17-22
 Location: Weld County, CO
 Rig Name: MS Energy Wireline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.23°
 Grid: East To True North
 File name: Y:\WINSER~1\2014SU~1\PDC\GJ\NATION~1\1722.SVY
 Date/Time: 26-Nov-14 / 11:55
 Curve Name: Surface - 6600' 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</i>		<i>Dogleg Severity Deg/100</i>
							<i>Distance FT</i>	<i>Direction Deg</i>	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.54	308.85	100.00	.30	-.37	.30	.47	308.85	.54
200.00	.26	260.41	200.00	.55	-.96	.55	1.11	300.02	.42
300.00	.35	302.83	299.99	.68	-1.44	.68	1.59	295.35	.24
400.00	.55	224.00	399.99	.50	-2.03	.50	2.09	283.89	.59
500.00	.65	233.61	499.99	-.18	-2.82	-.18	2.82	266.34	.14
600.00	.38	228.55	599.98	-.74	-3.52	-.74	3.60	258.20	.27
700.00	.40	202.91	699.98	-1.28	-3.91	-1.28	4.11	251.90	.17
800.00	.41	254.23	799.98	-1.70	-4.39	-1.70	4.70	248.87	.35
900.00	.50	200.72	899.98	-2.20	-4.89	-2.20	5.36	245.75	.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	
1000.00	.52	243.26	999.97	-2.81	-5.45	-2.81	6.13	242.68	.37
1100.00	.21	301.46	1099.97	-2.92	-6.01	-2.92	6.68	244.06	.45
1200.00	.13	150.86	1199.97	-2.93	-6.11	-2.93	6.77	244.41	.33
1300.00	.29	246.44	1299.97	-3.13	-6.29	-3.13	7.02	243.56	.33
1400.00	.23	187.90	1399.97	-3.43	-6.55	-3.43	7.39	242.37	.26
1500.00	.14	354.44	1499.97	-3.50	-6.58	-3.50	7.46	241.99	.37
1600.00	.44	224.45	1599.97	-3.66	-6.87	-3.66	7.78	241.97	.54
1700.00	.33	175.16	1699.97	-4.22	-7.11	-4.22	8.27	239.33	.34
1800.00	.44	244.63	1799.96	-4.67	-7.43	-4.67	8.78	237.87	.45
1900.00	1.02	236.57	1899.96	-5.32	-8.52	-5.32	10.05	238.01	.59
2000.00	1.14	226.35	1999.94	-6.50	-9.98	-6.50	11.91	236.94	.23
2100.00	.90	231.89	2099.92	-7.67	-11.32	-7.67	13.68	235.88	.26
2200.00	.90	235.92	2199.91	-8.60	-12.59	-8.60	15.25	235.68	.06
2300.00	1.02	211.44	2299.90	-9.80	-13.71	-9.80	16.85	234.45	.42
2400.00	.63	202.72	2399.89	-11.06	-14.38	-11.06	18.14	232.43	.41
2500.00	.42	217.10	2499.88	-11.86	-14.82	-11.86	18.98	231.32	.25
2600.00	.50	245.79	2599.88	-12.33	-15.43	-12.33	19.76	231.37	.24
2700.00	.38	223.03	2699.88	-12.75	-16.06	-12.75	20.51	231.54	.21
2800.00	.11	295.90	2799.87	-12.95	-16.37	-12.95	20.88	231.65	.36
2900.00	.23	268.93	2899.87	-12.92	-16.66	-12.92	21.08	232.21	.14
3000.00	.60	143.04	2999.87	-13.34	-16.54	-13.34	21.25	231.12	.76
3100.00	2.71	130.50	3099.82	-15.29	-14.43	-15.29	21.03	223.34	2.13
3200.00	3.79	141.28	3199.66	-19.41	-10.57	-19.41	22.10	208.57	1.24
3300.00	4.24	126.66	3299.42	-24.19	-5.53	-24.19	24.82	192.88	1.11
3400.00	3.77	116.24	3399.18	-27.85	.38	-27.85	27.86	179.22	.86
3500.00	4.19	110.63	3498.94	-30.59	6.75	-30.59	31.33	167.56	.57
3600.00	4.31	114.85	3598.66	-33.46	13.58	-33.46	36.11	157.91	.33
3700.00	4.55	112.10	3698.36	-36.53	20.66	-36.53	41.97	150.51	.32
3800.00	4.21	111.36	3798.07	-39.36	27.76	-39.36	48.16	144.81	.34

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	2.99	121.47	3897.87	-42.06	33.40	-42.06	53.71	141.55	1.37
4000.00	2.37	129.56	3997.76	-44.74	37.22	-44.74	58.19	140.24	.72
4100.00	2.04	129.98	4097.69	-47.20	40.17	-47.20	61.98	139.60	.33
4200.00	1.28	135.14	4197.65	-49.13	42.33	-49.13	64.85	139.26	.77
4300.00	1.11	134.18	4297.62	-50.60	43.81	-50.60	66.93	139.11	.17
4400.00	.54	140.08	4397.61	-51.64	44.81	-51.64	68.37	139.05	.58
4500.00	.51	256.85	4497.61	-52.10	44.68	-52.10	68.63	139.39	.89
4600.00	.58	287.02	4597.61	-52.05	43.76	-52.05	68.00	139.95	.29
4700.00	1.68	277.67	4697.59	-51.71	41.82	-51.71	66.50	141.03	1.11
4800.00	1.87	284.03	4797.54	-51.12	38.79	-51.12	64.17	142.81	.27
4900.00	1.79	275.42	4897.49	-50.57	35.65	-50.57	61.88	144.82	.29
5000.00	1.53	281.41	4997.45	-50.16	32.78	-50.16	59.93	146.83	.31
5100.00	1.53	261.06	5097.41	-50.11	30.16	-50.11	58.48	148.96	.54
5200.00	1.76	268.29	5197.37	-50.36	27.30	-50.36	57.28	151.54	.31
5300.00	1.50	262.40	5297.33	-50.58	24.47	-50.58	56.19	154.18	.31
5400.00	1.88	266.51	5397.29	-50.85	21.54	-50.85	55.22	157.05	.40
5500.00	1.62	267.33	5497.24	-51.02	18.49	-51.02	54.26	160.08	.26
5600.00	2.03	277.28	5597.19	-50.86	15.32	-50.86	53.12	163.24	.52
5700.00	1.81	299.14	5697.13	-49.87	12.18	-49.87	51.33	166.27	.76
5800.00	1.44	296.34	5797.09	-48.54	9.68	-48.54	49.49	168.73	.38
5900.00	1.68	302.35	5897.06	-47.20	7.31	-47.20	47.76	171.19	.29
6000.00	1.45	277.28	5997.02	-46.25	4.82	-46.25	46.50	174.05	.72
6100.00	1.74	270.21	6096.98	-46.09	2.04	-46.09	46.13	177.46	.35
6200.00	2.06	223.24	6196.93	-47.39	-.70	-47.39	47.40	180.85	1.54
6300.00	2.09	202.74	6296.87	-50.38	-2.64	-50.38	50.45	183.00	.74
6400.00	1.82	171.14	6396.81	-53.63	-3.10	-53.63	53.72	183.31	1.10
6500.00	2.05	159.95	6496.75	-56.88	-2.24	-56.88	56.93	182.26	.44
Last Survey Depth Recorded									
6600.00	2.38	149.25	6596.68	-60.35	-.57	-60.35	60.35	180.54	.53