



Job Number: SVGJ-160226  
Company: PDC  
Lease/Well: Hinkle 24-5  
Location: Weld County, CO  
Rig Name: MS Slickline 2788  
RKB: 0'  
G.L. or M.S.L.: GL

State/Country: Colorado/USA  
Declination: 8.31°  
Grid: East To True North  
File name: W:\2016\PDC\GJ\HINKLE\245.SVY  
Date/Time: 20-Oct-16 / 10:50  
Curve Name: Surface - 6600' M.D. (Rate Gyro)  
Lat: 40.335921 Long: -104.576756

MS Energy

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	.64	172.23	100.00	-.55	.08	-.55	.56	172.23	.64
200.00	.29	175.56	199.99	-1.36	.17	-1.36	1.37	172.84	.35
300.00	.22	174.97	299.99	-1.80	.21	-1.80	1.81	173.45	.07
400.00	.12	161.20	399.99	-2.09	.26	-2.09	2.11	172.98	.11
500.00	.04	59.67	499.99	-2.17	.32	-2.17	2.20	171.59	.13
600.00	.26	357.41	599.99	-1.93	.34	-1.93	1.96	169.97	.24
700.00	.38	359.92	699.99	-1.37	.33	-1.37	1.41	166.45	.12
800.00	.40	355.88	799.99	-.69	.31	-.69	.76	156.21	.03
900.00	.42	353.67	899.99	.02	.24	.02	.24	85.16	.03
1000.00	.44	339.88	999.98	.75	.07	.75	.75	5.15	.11
1100.00	.42	340.14	1099.98	1.45	-.19	1.45	1.46	352.56	.02
1200.00	.39	331.19	1199.98	2.09	-.48	2.09	2.15	347.14	.07
1300.00	.27	307.08	1299.98	2.53	-.83	2.53	2.67	341.86	.18
1400.00	.27	298.44	1399.98	2.79	-1.23	2.79	3.05	336.28	.04

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	
1500.00	.28	301.16	1499.97	3.03	-1.64	3.03	3.44	331.53	.02
1600.00	.23	302.09	1599.97	3.26	-2.02	3.26	3.83	328.21	.05
1700.00	.12	346.09	1699.97	3.47	-2.22	3.47	4.12	327.42	.17
1800.00	.34	99.45	1799.97	3.52	-1.95	3.52	4.02	331.04	.40
1900.00	.48	112.53	1899.97	3.31	-1.27	3.31	3.55	339.04	.17
2000.00	.56	120.09	1999.97	2.91	-.46	2.91	2.94	351.03	.11
2100.00	.79	126.18	2099.96	2.25	.52	2.25	2.31	13.00	.24
2200.00	.78	125.35	2199.95	1.45	1.63	1.45	2.19	48.31	.02
2300.00	.79	102.64	2299.94	.91	2.86	.91	3.00	72.37	.31
2400.00	.70	97.99	2399.93	.67	4.14	.67	4.19	80.76	.11
2500.00	.36	48.41	2499.93	.80	4.98	.80	5.04	80.91	.54
2600.00	.36	37.97	2599.93	1.25	5.41	1.25	5.55	76.95	.07
2700.00	.46	37.67	2699.92	1.82	5.84	1.82	6.12	72.72	.10
2800.00	.53	48.23	2799.92	2.44	6.43	2.44	6.88	69.20	.11
2900.00	.60	49.55	2899.91	3.09	7.18	3.09	7.82	66.70	.07
3000.00	.61	55.34	2999.91	3.73	8.01	3.73	8.84	65.02	.06
3100.00	.58	60.45	3099.90	4.29	8.89	4.29	9.87	64.26	.06
3200.00	.61	78.05	3199.90	4.65	9.85	4.65	10.89	64.75	.18
3300.00	.54	98.53	3299.89	4.69	10.84	4.69	11.81	66.62	.22
3400.00	.49	167.04	3399.89	4.20	11.40	4.20	12.15	69.78	.58
3500.00	.90	241.11	3499.88	3.40	10.81	3.40	11.33	72.52	.90
3600.00	1.43	252.42	3599.86	2.65	8.93	2.65	9.32	73.49	.58
3700.00	1.24	240.60	3699.84	1.74	6.80	1.74	7.02	75.65	.33
3800.00	1.16	233.71	3799.81	.61	5.04	.61	5.08	83.11	.16
3900.00	1.02	221.50	3899.80	-.66	3.64	-.66	3.70	100.23	.27
4000.00	1.09	183.06	3999.78	-2.27	3.00	-2.27	3.76	127.18	.70
4100.00	1.21	178.67	4099.76	-4.28	2.97	-4.28	5.21	145.23	.15
4200.00	.91	170.89	4199.74	-6.12	3.12	-6.12	6.87	152.98	.33
4300.00	.72	138.97	4299.73	-7.38	3.66	-7.38	8.23	153.62	.48
4400.00	.75	127.90	4399.73	-8.25	4.59	-8.25	9.44	150.93	.14
4500.00	.80	125.59	4499.72	-9.06	5.67	-9.06	10.69	147.96	.06
4600.00	1.43	130.28	4599.70	-10.27	7.19	-10.27	12.54	145.01	.64
4700.00	1.89	135.79	4699.65	-12.26	9.29	-12.26	15.39	142.84	.49
4800.00	2.72	146.88	4799.57	-15.43	11.74	-15.43	19.39	142.74	.94
4900.00	2.99	149.80	4899.45	-19.67	14.35	-19.67	24.35	143.90	.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	
5000.00	2.92	149.60	4999.32	-24.12	16.95	-24.12	29.48	144.91	.07
5100.00	2.32	152.31	5099.21	-28.11	19.18	-28.11	34.03	145.70	.61
5200.00	1.59	148.67	5199.15	-31.09	20.84	-31.09	37.43	146.17	.74
5300.00	1.31	142.75	5299.12	-33.19	22.25	-33.19	39.96	146.16	.32
5400.00	1.34	151.34	5399.09	-35.12	23.51	-35.12	42.26	146.21	.20
5500.00	1.74	194.98	5499.06	-37.61	23.67	-37.61	44.44	147.81	1.20
5600.00	1.50	196.03	5599.02	-40.34	22.92	-40.34	46.40	150.39	.24
5700.00	.86	188.81	5699.00	-42.34	22.44	-42.34	47.92	152.07	.66
5800.00	.66	191.62	5798.99	-43.64	22.21	-43.64	48.97	153.03	.20
5900.00	.51	170.91	5898.98	-44.65	22.17	-44.65	49.85	153.60	.26
6000.00	.64	161.71	5998.98	-45.62	22.41	-45.62	50.83	153.83	.16
6100.00	.61	170.17	6098.97	-46.67	22.68	-46.67	51.89	154.08	.10
6200.00	.67	170.43	6198.97	-47.77	22.87	-47.77	52.96	154.42	.06
6300.00	.60	177.31	6298.96	-48.87	22.99	-48.87	54.01	154.81	.10
6400.00	.56	182.93	6398.96	-49.88	22.99	-49.88	54.93	155.26	.07
6500.00	.67	194.95	6498.95	-50.94	22.81	-50.94	55.81	155.87	.17
Last Survey Depth Recorded									
6600.00	.75	184.90	6598.94	-52.15	22.61	-52.15	56.84	156.57	.15