



Job Number: SVGJ-140790
 Company: PDC
 Lease/Well: Putnam 24-29
 Location: Weld County, CO
 Rig Name: MS Energy Wireline
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.45°
 Grid: East To True North
 File name: S:\2014SU-1\PDC\GJ\PUTNAM\2429.SVY
 Date/Time: 01-Jul-14 / 15:28
 Curve Name: Surface - 7800' 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	.33	171.47	100.00	-.28	.04	-.28	.29	171.47	.33
200.00	.60	185.14	200.00	-1.09	.04	-1.09	1.09	177.98	.29
300.00	.31	197.92	299.99	-1.87	-.09	-1.87	1.87	182.80	.31
400.00	.49	218.74	399.99	-2.46	-.44	-2.46	2.50	190.19	.23
500.00	.62	188.00	499.99	-3.33	-.79	-3.33	3.42	193.27	.32
600.00	.49	183.89	599.98	-4.29	-.89	-4.29	4.38	191.71	.14
700.00	.36	252.55	699.98	-4.81	-1.22	-4.81	4.97	194.20	.49
800.00	.69	267.60	799.97	-4.93	-2.12	-4.93	5.37	203.25	.35
900.00	.42	263.66	899.97	-5.00	-3.09	-5.00	5.87	211.69	.27

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	.40	289.36	999.97	-4.92	-3.78	-4.92	6.21	217.51	.18
1100.00	.68	284.87	1099.96	-4.66	-4.68	-4.66	6.60	225.16	.28
1200.00	.74	269.62	1199.96	-4.51	-5.90	-4.51	7.43	232.63	.20
1300.00	.77	264.35	1299.95	-4.58	-7.22	-4.58	8.55	237.61	.08
1400.00	.71	266.42	1399.94	-4.68	-8.50	-4.68	9.71	241.16	.07
1500.00	1.06	279.74	1499.93	-4.56	-10.03	-4.56	11.02	245.54	.40
1600.00	1.06	269.24	1599.91	-4.42	-11.87	-4.42	12.67	249.57	.19
1700.00	.97	287.35	1699.89	-4.18	-13.60	-4.18	14.23	252.92	.33
1800.00	1.24	278.81	1799.88	-3.76	-15.48	-3.76	15.93	256.34	.32
1900.00	.96	280.94	1899.86	-3.44	-17.37	-3.44	17.71	258.81	.28
2000.00	1.00	270.74	1999.84	-3.27	-19.07	-3.27	19.34	260.28	.18
2100.00	1.15	269.71	2099.82	-3.26	-20.94	-3.26	21.19	261.15	.15
2200.00	1.14	267.16	2199.80	-3.32	-22.94	-3.32	23.18	261.78	.05
2300.00	1.13	268.39	2299.78	-3.39	-24.92	-3.39	25.15	262.25	.03
2400.00	1.15	280.63	2399.77	-3.24	-26.89	-3.24	27.08	263.14	.24
2500.00	1.45	285.79	2499.74	-2.71	-29.09	-2.71	29.22	264.69	.32
2600.00	1.55	288.58	2599.71	-1.93	-31.59	-1.93	31.65	266.50	.12
2700.00	1.50	291.73	2699.67	-1.01	-34.09	-1.01	34.11	268.29	.10
2800.00	1.23	279.77	2799.64	-.35	-36.36	-.35	36.37	269.45	.39
2900.00	.89	260.65	2899.62	-.29	-38.19	-.29	38.19	269.56	.49
3000.00	1.05	256.32	2999.61	-.64	-39.85	-.64	39.85	269.09	.18
3100.00	1.08	243.23	3099.59	-1.28	-41.58	-1.28	41.60	268.24	.24
3200.00	1.47	226.66	3199.57	-2.58	-43.35	-2.58	43.43	266.59	.53
3300.00	1.74	214.35	3299.53	-4.71	-45.14	-4.71	45.39	264.04	.44
3400.00	1.86	210.18	3399.48	-7.37	-46.81	-7.37	47.39	261.05	.18
3500.00	2.00	205.26	3499.42	-10.35	-48.37	-10.35	49.47	257.92	.22
3600.00	2.01	200.29	3599.36	-13.58	-49.73	-13.58	51.55	254.73	.17
3700.00	1.25	212.55	3699.32	-16.14	-50.92	-16.14	53.42	252.41	.83
3800.00	1.00	208.75	3799.30	-17.82	-51.93	-17.82	54.90	251.06	.26

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	.83	204.71	3899.29	-19.25	-52.65	-19.25	56.06	249.92	.18
4000.00	.83	222.98	3999.28	-20.43	-53.45	-20.43	57.22	249.08	.26
4100.00	1.41	234.44	4099.26	-21.68	-54.94	-21.68	59.06	248.47	.62
4200.00	1.23	225.23	4199.23	-23.15	-56.70	-23.15	61.25	247.79	.28
4300.00	1.40	239.07	4299.21	-24.54	-58.51	-24.54	63.45	247.25	.36
4400.00	1.88	242.60	4399.17	-25.92	-61.02	-25.92	66.30	246.99	.49
4500.00	2.71	244.57	4499.08	-27.69	-64.61	-27.69	70.29	246.80	.83
4600.00	3.28	241.99	4598.95	-30.05	-69.27	-30.05	75.51	246.55	.59
4700.00	3.71	244.23	4698.76	-32.80	-74.71	-32.80	81.59	246.30	.45
4800.00	3.88	244.06	4798.54	-35.68	-80.67	-35.68	88.21	246.14	.17
4900.00	3.81	243.91	4898.32	-38.62	-86.69	-38.62	94.91	245.99	.07
5000.00	3.65	240.60	4998.11	-41.65	-92.45	-41.65	101.40	245.75	.27
5100.00	3.95	236.29	5097.89	-45.12	-98.09	-45.12	107.97	245.30	.41
5200.00	4.29	232.89	5197.63	-49.29	-103.94	-49.29	115.03	244.63	.42
5300.00	4.21	233.01	5297.35	-53.76	-109.85	-53.76	122.30	243.92	.08
5400.00	3.41	225.96	5397.13	-58.03	-114.92	-58.03	128.74	243.21	.93
5500.00	2.98	224.74	5496.98	-61.95	-118.89	-61.95	134.06	242.48	.44
5600.00	2.81	230.34	5596.85	-65.36	-122.60	-65.36	138.94	241.94	.33
5700.00	1.63	231.62	5696.77	-67.80	-125.61	-67.80	142.74	241.64	1.18
5800.00	1.00	238.85	5796.74	-69.14	-127.47	-69.14	145.01	241.52	.65
5900.00	.61	274.06	5896.73	-69.55	-128.75	-69.55	146.33	241.62	.61
6000.00	.43	331.79	5996.73	-69.18	-129.45	-69.18	146.78	241.88	.53
6100.00	.55	336.13	6096.73	-68.41	-129.83	-68.41	146.75	242.21	.13
6200.00	.64	335.92	6196.72	-67.47	-130.25	-67.47	146.68	242.62	.09
6300.00	.54	340.46	6296.72	-66.51	-130.63	-66.51	146.59	243.02	.11
6400.00	.50	347.85	6396.71	-65.64	-130.88	-65.64	146.42	243.37	.08
6500.00	.49	43.17	6496.71	-64.90	-130.68	-64.90	145.91	243.59	.46
6600.00	.73	63.02	6596.70	-64.30	-129.82	-64.30	144.87	243.65	.32
6700.00	.94	77.51	6696.69	-63.84	-128.45	-63.84	143.44	243.57	.30

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	1.16	98.75	6796.68	-63.81	-126.65	-63.81	141.82	243.26	.44
6900.00	1.27	112.15	6896.65	-64.38	-124.63	-64.38	140.27	242.68	.30
7000.00	.85	110.53	6996.64	-65.06	-122.90	-65.06	139.06	242.10	.42
7100.00	.32	43.45	7096.63	-65.12	-122.02	-65.12	138.31	241.91	.78
7200.00	.77	321.50	7196.63	-64.39	-122.24	-64.39	138.17	242.22	.79
7300.00	.59	353.88	7296.62	-63.35	-122.72	-63.35	138.11	242.70	.42
7400.00	1.30	8.94	7396.61	-61.72	-122.60	-61.72	137.26	243.28	.75
7500.00	1.98	9.98	7496.57	-58.90	-122.12	-58.90	135.58	244.25	.68
7600.00	2.15	17.04	7596.50	-55.40	-121.27	-55.40	133.33	245.45	.31
7700.00	1.91	23.98	7696.44	-52.09	-120.04	-52.09	130.86	246.54	.34

Last Survey Depth Recorded									
7800.00	2.10	30.35	7796.38	-48.98	-118.44	-48.98	128.17	247.53	.29