



Job Number: SVGJ-170036 - API: 05-001-09274
Company: PDC
Lease/Well: McElwain 41-17
Location: Adams County, CO
Rig Name: BWS 27 Pulling Unit
RKB: 0'
G.L. or M.S.L.: GL

State/Country: Colorado/USA
Declination: 8.46°
Grid: East To True North
File name: C:\WINSER~1\2017\PDC\GJMCELWAIN\4117.SVY
Date/Time: 14-Mar-17 / 11:39
Curve Name: Surface - 7750' M.D. (Rate Gyro)
Lat: 39.969444 **Long:** -104.905556

MS Energy

WINSERVE SURVEY CALCULATIONS
Minimum Curvature Method
Vertical Section Plane .00
Vertical Section Referenced to Wellhead
Rectangular Coordinates Referenced to Wellhead

<i>Measured Depth</i> FT	<i>Incl Angle</i> Deg	<i>Drift Direction</i> Deg	<i>True Vertical Depth</i>	<i>N-S</i> FT	<i>E-W</i> FT	<i>Vertical Section</i> FT	<i>CLOSURE</i>		<i>Dogleg Severity</i> Deg/100
							<i>Distance</i> FT	<i>Direction</i> Deg	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.58	328.05	100.00	.43	-.27	.43	.51	328.05	.58
200.00	.45	303.78	199.99	1.08	-.86	1.08	1.38	321.33	.25
300.00	.42	277.90	299.99	1.35	-1.55	1.35	2.05	310.94	.20
400.00	.45	271.27	399.99	1.41	-2.31	1.41	2.70	301.34	.06
500.00	.44	272.54	499.99	1.43	-3.08	1.43	3.40	294.89	.01
600.00	.54	240.05	599.98	1.21	-3.88	1.21	4.06	287.37	.29
700.00	.49	224.54	699.98	.67	-4.58	.67	4.63	278.35	.15
800.00	.23	220.69	799.98	.22	-5.01	.22	5.02	272.46	.26
900.00	.19	243.13	899.98	-.01	-5.29	-.01	5.29	269.87	.09
1000.00	.36	214.92	999.97	-.34	-5.62	-.34	5.63	266.50	.21
1100.00	.50	212.19	1099.97	-.97	-6.03	-.97	6.11	260.86	.14
1200.00	.60	188.98	1199.97	-1.86	-6.35	-1.86	6.61	253.69	.24

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	
1300.00	.57	181.17	1299.96	-2.87	-6.44	-2.87	7.05	245.96	.09
1400.00	.45	206.35	1399.96	-3.72	-6.62	-3.72	7.60	240.67	.25
1500.00	.45	227.00	1499.95	-4.34	-7.09	-4.34	8.31	238.51	.16
1600.00	.46	245.90	1599.95	-4.77	-7.74	-4.77	9.09	238.34	.15
1700.00	.53	260.12	1699.95	-5.02	-8.56	-5.02	9.92	239.63	.14
1800.00	.64	269.38	1799.94	-5.10	-9.57	-5.10	10.85	241.95	.14
1900.00	.72	272.22	1899.94	-5.08	-10.76	-5.08	11.90	244.72	.09
2000.00	.83	275.68	1999.93	-4.99	-12.11	-4.99	13.10	247.62	.12
2100.00	.88	278.38	2099.92	-4.80	-13.59	-4.80	14.41	250.53	.06
2200.00	.97	281.69	2199.90	-4.52	-15.18	-4.52	15.84	253.42	.10
2300.00	1.01	284.90	2299.89	-4.12	-16.86	-4.12	17.36	256.26	.07
2400.00	1.09	277.09	2399.87	-3.78	-18.65	-3.78	19.03	258.55	.16
2500.00	1.81	252.65	2499.84	-4.13	-21.11	-4.13	21.51	258.93	.93
2600.00	2.24	247.54	2599.78	-5.35	-24.42	-5.35	25.00	257.65	.47
2700.00	2.45	244.25	2699.69	-7.02	-28.15	-7.02	29.01	255.99	.25
2800.00	2.11	243.47	2799.61	-8.77	-31.72	-8.77	32.91	254.54	.34
2900.00	1.61	237.89	2899.56	-10.34	-34.56	-10.34	36.07	253.34	.53
3000.00	.90	251.07	2999.54	-11.35	-36.49	-11.35	38.22	252.73	.76
3100.00	.87	281.69	3099.52	-11.45	-37.98	-11.45	39.67	253.23	.47
3200.00	1.39	297.30	3199.51	-10.74	-39.80	-10.74	41.22	254.90	.60
3300.00	1.67	305.90	3299.47	-9.33	-42.06	-9.33	43.08	257.50	.36
3400.00	1.20	315.91	3399.44	-7.72	-43.97	-7.72	44.64	260.04	.53
3500.00	1.01	339.86	3499.42	-6.14	-45.00	-6.14	45.42	262.23	.49
3600.00	1.02	339.81	3599.40	-4.48	-45.61	-4.48	45.83	264.39	.01
3700.00	1.06	312.41	3699.39	-3.02	-46.60	-3.02	46.70	266.30	.49
3800.00	1.13	311.08	3799.37	-1.75	-48.03	-1.75	48.06	267.92	.07
3900.00	1.14	306.53	3899.35	-.51	-49.57	-.51	49.57	269.42	.09
4000.00	.88	302.14	3999.33	.50	-51.02	.50	51.02	270.56	.27
4100.00	.61	280.09	4099.33	1.00	-52.19	1.00	52.20	271.09	.39
4200.00	.64	252.99	4199.32	.93	-53.25	.93	53.26	271.00	.29
4300.00	.97	248.90	4299.31	.46	-54.58	.46	54.58	270.48	.33
4400.00	1.15	248.91	4399.29	-.21	-56.30	-.21	56.30	269.79	.18
4500.00	1.67	244.49	4499.26	-1.20	-58.55	-1.20	58.56	268.83	.53
4600.00	2.26	244.03	4599.20	-2.69	-61.64	-2.69	61.70	267.50	.59

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	
4700.00	2.28	240.61	4699.13	-4.53	-65.15	-4.53	65.30	266.03	.14
4800.00	2.84	238.39	4799.03	-6.80	-68.99	-6.80	69.32	264.37	.57
4900.00	2.88	233.56	4898.90	-9.59	-73.12	-9.59	73.75	262.53	.24
5000.00	2.62	228.77	4998.79	-12.59	-76.86	-12.59	77.88	260.70	.35
5100.00	2.59	227.19	5098.68	-15.63	-80.24	-15.63	81.74	258.98	.08
5200.00	2.42	226.24	5198.59	-18.63	-83.42	-18.63	85.47	257.41	.17
5300.00	2.23	223.19	5298.50	-21.51	-86.27	-21.51	88.92	256.00	.23
5400.00	1.56	200.48	5398.45	-24.20	-88.08	-24.20	91.35	254.64	.99
5500.00	1.42	213.77	5498.42	-26.51	-89.25	-26.51	93.10	253.46	.37
5600.00	1.10	232.43	5598.39	-28.12	-90.70	-28.12	94.96	252.77	.52
5700.00	.88	256.37	5698.38	-28.89	-92.20	-28.89	96.62	252.60	.46
5800.00	.91	274.92	5798.37	-29.00	-93.74	-29.00	98.13	252.81	.29
5900.00	1.19	274.45	5898.35	-28.85	-95.57	-28.85	99.83	253.20	.28
6000.00	1.10	256.48	5998.33	-28.99	-97.54	-28.99	101.76	253.44	.37
6100.00	1.02	236.12	6098.31	-29.72	-99.21	-29.72	103.56	253.33	.38
6200.00	1.00	243.03	6198.30	-30.61	-100.73	-30.61	105.27	253.10	.12
6300.00	.84	254.16	6298.28	-31.20	-102.21	-31.20	106.87	253.02	.24
6400.00	.98	261.08	6398.27	-31.54	-103.76	-31.54	108.45	253.09	.18
6500.00	.62	258.44	6498.26	-31.78	-105.13	-31.78	109.83	253.18	.36
6600.00	.58	296.55	6598.26	-31.66	-106.12	-31.66	110.74	253.39	.39
6700.00	1.04	297.42	6698.25	-31.01	-107.37	-31.01	111.76	253.89	.46
6800.00	.82	311.40	6798.23	-30.12	-108.72	-30.12	112.81	254.51	.31
6900.00	.67	342.68	6898.23	-29.09	-109.43	-29.09	113.23	255.11	.43
7000.00	.39	149.74	6998.22	-28.83	-109.43	-28.83	113.16	255.24	1.05
7100.00	.79	204.71	7098.22	-29.75	-109.55	-29.75	113.51	254.81	.65
7200.00	.93	207.80	7198.21	-31.09	-110.21	-31.09	114.52	254.25	.15
7300.00	.91	213.33	7298.20	-32.47	-111.03	-32.47	115.68	253.70	.09
7400.00	.62	211.08	7398.19	-33.60	-111.74	-33.60	116.69	253.26	.29
7500.00	.50	214.33	7498.18	-34.42	-112.27	-34.42	117.43	252.95	.12
7600.00	.39	190.35	7598.18	-35.12	-112.58	-35.12	117.93	252.67	.21
7700.00	.35	101.01	7698.18	-35.51	-112.34	-35.51	117.82	252.46	.52
Last Survey Depth Recorded									
7750.00	.47	108.51	7748.18	-35.61	-111.99	-35.61	117.52	252.36	.26