



Job Number: SVGJ-180083 - API: 05-123-12235
 Company: PDC
 Lease/Well: Swanson 34-20
 Location: Weld County, CO
 Rig Name: Production
 RKB: 0'
 G.L. or M.S.L.: GL

State/Country: Colorado/USA
 Declination: 8.301°
 Grid: East To True North
 File name: C:\WINSER~1\2018\PDC\GJ\SWANSON\3420.SVY
 Date/Time: 28-Jun-18 / 09:11
 Curve Name: Surface - 6625' M.D. (Rate Gyro)
 Lat: 40.468162 Long: -104.799487

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 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	.88	314.36	100.00	.54	-.55	.54	.77	314.36	.88
200.00	1.01	313.85	199.98	1.68	-1.73	1.68	2.42	314.17	.13
300.00	.98	316.01	299.97	2.91	-2.96	2.91	4.15	314.48	.05
400.00	.87	294.67	399.95	3.84	-4.25	3.84	5.73	312.14	.36
500.00	.32	297.10	499.95	4.29	-5.19	4.29	6.73	309.58	.55
600.00	.30	319.39	599.95	4.61	-5.60	4.61	7.26	309.45	.12
700.00	.28	335.93	699.95	5.03	-5.87	5.03	7.74	310.60	.09
800.00	.43	289.83	799.94	5.38	-6.33	5.38	8.31	310.40	.31
900.00	.36	277.55	899.94	5.55	-6.99	5.55	8.93	308.46	.11
1000.00	.20	258.58	999.94	5.56	-7.47	5.56	9.32	306.65	.18
1100.00	.09	254.05	1099.94	5.50	-7.72	5.50	9.48	305.48	.11
1200.00	.11	294.65	1199.94	5.52	-7.88	5.52	9.63	305.01	.07

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	.14	311.86	1299.94	5.64	-8.06	5.64	9.84	304.99	.05
1400.00	.40	345.16	1399.94	6.06	-8.24	6.06	10.23	306.34	.29
1500.00	.51	337.65	1499.94	6.81	-8.50	6.81	10.89	308.71	.12
1600.00	.46	328.25	1599.93	7.56	-8.88	7.56	11.67	310.42	.09
1700.00	.39	321.09	1699.93	8.17	-9.31	8.17	12.38	311.28	.09
1800.00	.37	314.97	1799.93	8.66	-9.75	8.66	13.04	311.63	.05
1900.00	.30	287.86	1899.93	8.97	-10.23	8.97	13.60	311.26	.17
2000.00	.31	247.66	1999.92	8.95	-10.73	8.95	13.97	309.84	.21
2100.00	.27	218.99	2099.92	8.66	-11.12	8.66	14.10	307.91	.15
2200.00	.55	221.69	2199.92	8.12	-11.59	8.12	14.15	305.02	.28
2300.00	1.01	216.37	2299.91	7.05	-12.43	7.05	14.30	299.57	.47
2400.00	1.12	205.34	2399.89	5.46	-13.37	5.46	14.45	292.21	.23
2500.00	1.22	213.52	2499.87	3.69	-14.38	3.69	14.85	284.39	.19
2600.00	1.24	216.80	2599.85	1.94	-15.62	1.94	15.74	277.07	.07
2700.00	1.28	214.47	2699.83	.15	-16.90	.15	16.90	270.51	.06
2800.00	1.25	217.18	2799.80	-1.64	-18.19	-1.64	18.26	264.85	.07
2900.00	1.26	218.10	2899.78	-3.37	-19.53	-3.37	19.82	260.19	.02
3000.00	1.18	225.99	2999.75	-4.96	-20.94	-4.96	21.52	256.69	.19
3100.00	1.19	231.85	3099.73	-6.31	-22.50	-6.31	23.37	254.33	.12
3200.00	1.08	230.58	3199.71	-7.55	-24.05	-7.55	25.20	252.56	.11
3300.00	.80	221.24	3299.70	-8.68	-25.23	-8.68	26.68	251.03	.32
3400.00	.56	221.25	3399.69	-9.57	-26.02	-9.57	27.72	249.81	.24
3500.00	.41	232.36	3499.69	-10.15	-26.62	-10.15	28.49	249.12	.18
3600.00	.42	222.01	3599.69	-10.64	-27.15	-10.64	29.16	248.59	.08
3700.00	.65	215.69	3699.68	-11.38	-27.73	-11.38	29.97	247.69	.24
3800.00	.71	214.52	3799.68	-12.35	-28.41	-12.35	30.98	246.51	.06
3900.00	.68	215.57	3899.67	-13.34	-29.11	-13.34	32.02	245.37	.03
4000.00	.48	220.47	3999.66	-14.14	-29.72	-14.14	32.92	244.55	.21
4100.00	.21	294.95	4099.66	-14.38	-30.16	-14.38	33.42	244.50	.47
4200.00	.39	301.18	4199.66	-14.13	-30.62	-14.13	33.72	245.23	.18
4300.00	.35	321.17	4299.66	-13.72	-31.10	-13.72	33.99	246.20	.13
4400.00	.27	332.80	4399.66	-13.27	-31.40	-13.27	34.09	247.09	.10
4500.00	.35	319.57	4499.66	-12.83	-31.71	-12.83	34.20	247.97	.11
4600.00	.42	304.59	4599.65	-12.39	-32.21	-12.39	34.51	248.96	.12

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	.43	296.52	4699.65	-12.01	-32.84	-12.01	34.97	249.91	.06
4800.00	.32	299.92	4799.65	-11.70	-33.42	-11.70	35.41	250.70	.11
4900.00	.36	291.40	4899.65	-11.45	-33.96	-11.45	35.83	251.36	.06
5000.00	.33	279.84	4999.64	-11.29	-34.53	-11.29	36.33	251.90	.08
5100.00	.26	288.21	5099.64	-11.17	-35.03	-11.17	36.77	252.32	.08
5200.00	.26	266.60	5199.64	-11.11	-35.47	-11.11	37.17	252.61	.10
5300.00	.41	281.80	5299.64	-11.05	-36.05	-11.05	37.70	252.96	.17
5400.00	.48	278.03	5399.64	-10.92	-36.81	-10.92	38.40	253.48	.08
5500.00	.62	278.67	5499.63	-10.78	-37.76	-10.78	39.27	254.07	.14
5600.00	.60	274.04	5599.63	-10.66	-38.82	-10.66	40.26	254.65	.05
5700.00	.61	289.47	5699.62	-10.44	-39.85	-10.44	41.19	255.31	.16
5800.00	.64	293.32	5799.62	-10.05	-40.86	-10.05	42.08	256.19	.05
5900.00	.73	304.20	5899.61	-9.47	-41.90	-9.47	42.96	257.27	.16
6000.00	.78	308.74	5999.60	-8.68	-42.96	-8.68	43.83	258.57	.08
6100.00	.78	302.49	6099.59	-7.89	-44.06	-7.89	44.76	259.85	.09
6200.00	.80	317.44	6199.58	-7.01	-45.11	-7.01	45.65	261.16	.21
6300.00	.84	317.28	6299.57	-5.96	-46.08	-5.96	46.46	262.63	.04
6400.00	.83	307.49	6399.56	-4.98	-47.15	-4.98	47.41	263.97	.14
6500.00	.69	303.95	6499.55	-4.20	-48.22	-4.20	48.41	265.02	.15
6600.00	.27	305.84	6599.55	-3.73	-48.92	-3.73	49.06	265.64	.42
Last Survey Depth Recorded									
6625.00	.21	281.57	6624.55	-3.68	-49.01	-3.68	49.15	265.70	.47