



Job Number: SVGJ-180041 - API: 05-123-12669

Company: PDC

Lease/Well: Landau 2

Location: Weld County, CO

Rig Name: N/A

RKB: 0'

G.L. or M.S.L.: GL

State/Country: Colorado/USA

Declination: 8.248°

Grid: East To True North

File name: C:\WINSER~1\2018\PDC\GJ\LANDAU\2.SVY

Date/Time: 02-Apr-18 / 10:50

Curve Name: Surface - 6900' M.D. (Rate Gyro)

Lat: 40.426243 Long: -104.64212

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	.43	13.82	100.00	.36	.09	.36	.38	13.82	.43
200.00	.13	7.78	200.00	.84	.19	.84	.86	13.03	.30
300.00	.26	25.67	300.00	1.16	.31	1.16	1.20	14.91	.14
400.00	.21	344.50	400.00	1.54	.36	1.54	1.58	13.08	.17
500.00	.29	24.76	500.00	1.95	.41	1.95	1.99	12.03	.19
600.00	.15	38.27	599.99	2.28	.60	2.28	2.36	14.79	.15
700.00	.08	310.99	699.99	2.43	.63	2.43	2.51	14.55	.17
800.00	.14	24.36	799.99	2.58	.63	2.58	2.66	13.66	.14
900.00	.26	331.36	899.99	2.89	.57	2.89	2.95	11.13	.21
1000.00	.21	29.45	999.99	3.25	.55	3.25	3.30	9.61	.23
1100.00	.06	160.37	1099.99	3.36	.66	3.36	3.43	11.08	.25
1200.00	.14	60.00	1199.99	3.37	.78	3.37	3.46	13.04	.16

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	.52	90.59	1299.99	3.43	1.34	3.43	3.68	21.35	.41
1400.00	.64	108.63	1399.99	3.25	2.32	3.25	3.99	35.59	.22
1500.00	.57	108.48	1499.98	2.91	3.33	2.91	4.42	48.79	.07
1600.00	.81	103.80	1599.97	2.59	4.48	2.59	5.18	60.03	.25
1700.00	.85	128.42	1699.96	1.96	5.75	1.96	6.07	71.21	.36
1800.00	.68	126.09	1799.95	1.15	6.81	1.15	6.91	80.45	.17
1900.00	.91	125.42	1899.94	.34	7.94	.34	7.95	87.58	.23
2000.00	.73	138.22	1999.93	-.60	9.01	-.60	9.03	93.80	.26
2100.00	.56	130.73	2099.93	-1.39	9.80	-1.39	9.90	98.09	.19
2200.00	.80	121.56	2199.92	-2.08	10.77	-2.08	10.97	100.92	.26
2300.00	.58	115.19	2299.91	-2.66	11.82	-2.66	12.12	102.67	.23
2400.00	.61	135.34	2399.91	-3.25	12.65	-3.25	13.07	104.41	.21
2500.00	.66	121.92	2499.90	-3.94	13.52	-3.94	14.08	106.23	.16
2600.00	.50	136.00	2599.90	-4.55	14.31	-4.55	15.02	107.65	.21
2700.00	.60	114.45	2699.89	-5.08	15.09	-5.08	15.92	108.62	.23
2800.00	.50	136.59	2799.89	-5.62	15.87	-5.62	16.83	109.50	.23
2900.00	.65	114.89	2899.88	-6.17	16.68	-6.17	17.79	110.31	.26
3000.00	.49	130.82	2999.88	-6.69	17.52	-6.69	18.75	110.91	.22
3100.00	.74	126.83	3099.87	-7.36	18.36	-7.36	19.78	111.84	.25
3200.00	.74	151.81	3199.86	-8.31	19.18	-8.31	20.91	113.44	.32
3300.00	.67	148.19	3299.86	-9.38	19.79	-9.38	21.90	115.36	.08
3400.00	.78	161.08	3399.85	-10.52	20.32	-10.52	22.89	117.37	.20
3500.00	.63	207.98	3499.84	-11.65	20.29	-11.65	23.39	119.87	.58
3600.00	.67	192.68	3599.84	-12.71	19.90	-12.71	23.61	122.56	.18
3700.00	.83	200.02	3699.83	-13.96	19.52	-13.96	24.00	125.56	.19
3800.00	.60	204.50	3799.82	-15.11	19.06	-15.11	24.32	128.42	.24
3900.00	.74	209.57	3899.81	-16.15	18.52	-16.15	24.58	131.09	.15
4000.00	.19	211.88	3999.81	-16.86	18.12	-16.86	24.74	132.93	.55
4100.00	.28	310.34	4099.81	-16.84	17.84	-16.84	24.53	133.34	.36
4200.00	.56	357.46	4199.81	-16.19	17.63	-16.19	23.94	132.56	.42
4300.00	.52	353.64	4299.80	-15.25	17.56	-15.25	23.26	130.97	.05
4400.00	.63	31.93	4399.80	-14.33	17.80	-14.33	22.86	128.84	.39
4500.00	.67	23.17	4499.79	-13.33	18.32	-13.33	22.66	126.04	.11
4600.00	.54	43.83	4599.78	-12.45	18.88	-12.45	22.62	123.41	.25

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	.73	23.29	4699.78	-11.53	19.46	-11.53	22.62	120.64	.29
4800.00	.85	14.21	4799.77	-10.22	19.89	-10.22	22.37	117.20	.17
4900.00	.99	19.00	4899.76	-8.69	20.36	-8.69	22.13	113.11	.16
5000.00	.74	8.80	4999.74	-7.23	20.74	-7.23	21.96	109.23	.29
5100.00	.75	29.00	5099.74	-6.02	21.15	-6.02	21.99	105.89	.26
5200.00	.67	13.91	5199.73	-4.88	21.61	-4.88	22.15	102.73	.20
5300.00	.42	42.18	5299.72	-4.04	22.00	-4.04	22.37	100.42	.36
5400.00	.62	45.90	5399.72	-3.40	22.63	-3.40	22.88	98.53	.20
5500.00	.27	44.19	5499.72	-2.85	23.18	-2.85	23.36	97.01	.35
5600.00	.37	46.15	5599.72	-2.46	23.58	-2.46	23.71	95.95	.10
5700.00	.66	91.34	5699.71	-2.25	24.39	-2.25	24.49	95.26	.48
5800.00	.63	106.60	5799.71	-2.42	25.49	-2.42	25.61	95.42	.17
5900.00	.80	119.34	5899.70	-2.92	26.63	-2.92	26.79	96.25	.23
6000.00	.88	108.63	5999.69	-3.50	27.96	-3.50	28.18	97.14	.18
6100.00	.72	107.51	6099.68	-3.94	29.29	-3.94	29.55	97.66	.16
6200.00	.74	122.53	6199.67	-4.47	30.43	-4.47	30.76	98.36	.19
6300.00	.89	125.02	6299.66	-5.27	31.61	-5.27	32.05	99.46	.15
6400.00	.89	125.77	6399.65	-6.17	32.88	-6.17	33.45	100.62	.01
6500.00	.91	153.70	6499.63	-7.33	33.86	-7.33	34.65	102.22	.43
6600.00	1.30	156.07	6599.62	-9.08	34.67	-9.08	35.84	104.68	.39
6700.00	1.45	157.07	6699.59	-11.28	35.63	-11.28	37.37	107.57	.15
6800.00	1.57	151.06	6799.55	-13.65	36.78	-13.65	39.23	110.36	.20
Last Survey Depth Recorded									
6900.00	1.34	147.16	6899.52	-15.83	38.08	-15.83	41.24	112.57	.25