



Job Number: 115296  
 Company: Dakota Exp.  
 Lease/Well: Sec. 24 6-81-24-4  
 Location: State 6-81-24-4  
 Rig Name: Patterson 166  
 RKB: 8394  
 G.L. or M.S.L.: 8374

State/Country: Colorado / USA  
 Declination: 9.72  
 Grid: True  
 File name: C:\WINSERVE\115296.SVY  
 Date/Time: 04-Aug-11 / 14:40  
 Curve Name: State 6-81-24-4 T.D Curve

WINSERVE SURVEY CALCULATIONS  
 Minimum Curvature Method  
 Vertical Section Plane 180.00  
 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	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
117.00	.20	259.30	117.00	-.04	-.20	.04	.20	259.30	.17
148.00	.20	84.00	148.00	-.04	-.20	.04	.20	258.06	1.29
210.00	.90	68.40	210.00	.15	.36	-.15	.39	67.64	1.14
268.00	.70	353.50	267.99	.67	.74	-.67	1.00	48.07	1.70
323.00	.40	308.80	322.99	1.12	.56	-1.12	1.25	26.36	.91
386.00	.40	9.60	385.99	1.48	.42	-1.48	1.54	15.93	.64
450.00	.40	24.70	449.99	1.90	.55	-1.90	1.98	16.20	.16
513.00	.50	60.00	512.99	2.24	.88	-2.24	2.40	21.52	.46
577.00	.20	152.00	576.98	2.28	1.18	-2.28	2.56	27.31	.85
640.00	.50	121.20	639.98	2.04	1.46	-2.04	2.51	35.66	.55
711.00	.80	75.20	710.98	2.00	2.21	-2.00	2.98	47.75	.81

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
790.00	.20	99.70	789.98	2.12	2.88	-2.12	3.57	53.58	.79
852.00	.20	279.70	851.98	2.12	2.88	-2.12	3.57	53.58	.65
917.00	1.30	325.30	916.97	2.75	2.34	-2.75	3.61	40.47	1.80
980.00	1.90	310.10	979.94	4.01	1.14	-4.01	4.17	15.86	1.16
1044.00	2.60	302.00	1043.89	5.46	-.90	-5.46	5.54	350.60	1.20
1107.00	1.40	273.60	1106.86	6.27	-2.88	-6.27	6.90	335.29	2.42
1171.00	1.00	264.60	1170.84	6.26	-4.22	-6.26	7.55	326.03	.69
1234.00	1.10	217.70	1233.83	5.73	-5.14	-5.73	7.70	318.14	1.33
1298.00	1.10	79.90	1297.83	5.35	-4.91	-5.35	7.26	317.49	3.21
1361.00	2.20	43.70	1360.80	6.33	-3.48	-6.33	7.23	331.24	2.32
1425.00	1.80	16.50	1424.76	8.19	-2.34	-8.19	8.52	344.03	1.59
1488.00	1.40	14.60	1487.74	9.88	-1.87	-9.88	10.05	349.29	.64
1552.00	1.80	359.50	1551.72	11.64	-1.68	-11.64	11.76	351.79	.90
1615.00	1.10	342.70	1614.70	13.21	-1.87	-13.21	13.34	351.95	1.29
1679.00	.80	297.80	1678.69	14.00	-2.45	-14.00	14.22	350.09	1.21
1743.00	.20	22.80	1742.68	14.31	-2.80	-14.31	14.59	348.94	1.26
1806.00	.70	8.40	1805.68	14.80	-2.70	-14.80	15.04	349.66	.81
1870.00	.20	52.70	1869.68	15.25	-2.55	-15.25	15.46	350.50	.90
1934.00	.70	185.80	1933.68	14.93	-2.50	-14.93	15.14	350.48	1.33
1998.00	1.10	186.40	1997.67	13.93	-2.61	-13.93	14.17	349.38	.63
2061.00	.50	202.40	2060.66	13.08	-2.78	-13.08	13.37	347.98	1.01
2125.00	.80	187.40	2124.66	12.37	-2.95	-12.37	12.72	346.60	.54
2188.00	1.20	203.40	2187.65	11.33	-3.27	-11.33	11.79	343.92	.77
2252.00	.70	253.70	2251.64	10.61	-3.91	-10.61	11.30	339.78	1.45
2315.00	.40	191.50	2314.64	10.28	-4.32	-10.28	11.16	337.21	.99
2379.00	1.00	248.20	2378.64	9.86	-4.88	-9.86	11.00	333.64	1.33
2443.00	.90	241.20	2442.63	9.41	-5.84	-9.41	11.08	328.16	.24
2506.00	.30	300.60	2505.62	9.25	-6.42	-9.25	11.26	325.25	1.25
2570.00	.50	249.20	2569.62	9.24	-6.82	-9.24	11.49	323.55	.61
2633.00	.60	291.30	2632.62	9.26	-7.39	-9.26	11.85	321.42	.64
2697.00	.80	211.60	2696.62	9.00	-7.93	-9.00	12.00	318.61	1.42

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
2760.00	.20	203.80	2759.61	8.53	-8.21	-8.53	11.84	316.09	.96
2823.00	.10	137.80	2822.61	8.39	-8.22	-8.39	11.74	315.59	.29
2886.00	.50	232.50	2885.61	8.18	-8.40	-8.18	11.72	314.24	.82
2949.00	1.00	185.20	2948.61	7.46	-8.67	-7.46	11.44	310.74	1.20
3013.00	.90	190.50	3012.60	6.41	-8.81	-6.41	10.90	306.06	.21
3076.00	.40	5.50	3075.60	6.15	-8.88	-6.15	10.80	304.70	2.06
3140.00	.90	351.60	3139.59	6.87	-8.93	-6.87	11.26	307.56	.81
3203.00	1.90	287.20	3202.58	7.66	-10.00	-7.66	12.60	307.47	2.72
3298.00	1.40	253.70	3297.54	7.80	-12.62	-7.80	14.84	301.74	1.12
3393.00	.30	292.00	3392.53	7.57	-13.96	-7.57	15.88	298.47	1.24
3455.00	1.10	281.70	3454.52	7.75	-14.70	-7.75	16.62	297.82	1.30
3551.00	.50	111.40	3550.52	7.79	-15.21	-7.79	17.09	297.11	1.66
3614.00	.30	359.40	3613.52	7.85	-14.95	-7.85	16.89	297.70	1.07
3678.00	.40	355.80	3677.52	8.24	-14.97	-8.24	17.09	298.83	.16
3742.00	.20	243.90	3741.51	8.42	-15.09	-8.42	17.28	299.15	.80
3805.00	.40	324.90	3804.51	8.55	-15.31	-8.55	17.54	299.17	.66
3869.00	.80	343.90	3868.51	9.16	-15.57	-9.16	18.06	300.47	.69
3932.00	.80	212.80	3931.51	9.21	-15.93	-9.21	18.40	300.05	2.31
3996.00	1.00	257.40	3995.50	8.71	-16.71	-8.71	18.85	297.54	1.11
4060.00	.40	299.90	4059.50	8.70	-17.45	-8.70	19.50	296.51	1.18
4123.00	1.30	211.30	4122.49	8.20	-18.01	-8.20	19.79	294.48	2.14
4186.00	2.00	224.90	4185.46	6.81	-19.16	-6.81	20.34	289.58	1.27
4249.00	1.60	214.50	4248.43	5.31	-20.44	-5.31	21.11	284.57	.82
4313.00	3.10	225.80	4312.38	3.37	-22.18	-3.37	22.44	278.63	2.44
4376.00	3.10	209.10	4375.29	.69	-24.23	-.69	24.24	271.63	1.43
4408.00	2.60	211.20	4407.25	-.69	-25.03	.69	25.04	268.43	1.60
4472.00	2.60	191.10	4471.18	-3.35	-26.06	3.35	26.27	262.67	1.42
4535.00	1.60	188.90	4534.14	-5.62	-26.47	5.62	27.06	258.01	1.59
4598.00	2.00	209.10	4597.11	-7.45	-27.14	7.45	28.15	254.65	1.18
4662.00	3.20	218.60	4661.04	-9.82	-28.80	9.82	30.43	251.16	1.99
4726.00	2.60	217.00	4724.96	-12.38	-30.79	12.38	33.18	248.09	.95

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
4789.00	1.80	226.90	4787.91	-14.20	-32.37	14.20	35.35	246.32	1.40
4853.00	.80	252.10	4851.90	-15.02	-33.53	15.02	36.74	245.87	1.76
4916.00	.80	349.20	4914.89	-14.72	-34.03	14.72	37.08	246.60	1.90
4979.00	.30	34.30	4977.89	-14.16	-34.02	14.16	36.85	247.41	.99
5043.00	.80	327.10	5041.89	-13.64	-34.17	13.64	36.79	248.23	1.15
5106.00	.30	.30	5104.88	-13.11	-34.41	13.11	36.82	249.14	.91
5170.00	.80	103.90	5168.88	-13.05	-33.97	13.05	36.39	248.99	1.43
5233.00	.40	346.40	5231.88	-12.94	-33.60	12.94	36.00	248.94	1.66
5297.00	.80	328.30	5295.88	-12.34	-33.88	12.34	36.06	249.98	.68
5360.00	.80	71.60	5358.87	-11.83	-33.70	11.83	35.71	250.66	1.99
Tie in for curve.									
5424.00	1.10	65.70	5422.86	-11.44	-32.71	11.44	34.65	250.73	.49
5487.00	.90	227.10	5485.86	-11.52	-32.52	11.52	34.51	250.49	3.13
5551.00	2.42	234.10	5549.83	-12.66	-33.99	12.66	36.27	249.57	2.39
5583.00	3.20	212.40	5581.79	-13.81	-35.01	13.81	37.64	248.48	4.08
5615.00	5.10	198.50	5613.71	-15.91	-35.94	15.91	39.31	246.12	6.68
5647.00	8.50	186.00	5645.48	-19.61	-36.64	19.61	41.56	241.84	11.53
5679.00	11.90	195.10	5676.97	-25.15	-37.75	25.15	45.36	236.32	11.73
5711.00	15.60	193.60	5708.05	-32.52	-39.62	32.52	51.26	230.62	11.62
5743.00	19.10	190.40	5738.59	-41.86	-41.58	41.86	59.00	224.81	11.33
5774.00	21.10	188.70	5767.70	-52.36	-43.34	52.36	67.97	219.61	6.72
5806.00	22.70	186.80	5797.39	-64.19	-44.94	64.19	78.36	215.00	5.47
5838.00	24.40	184.50	5826.73	-76.91	-46.19	76.91	89.72	210.99	6.04
5870.00	26.40	182.90	5855.63	-90.61	-47.07	90.61	102.10	207.45	6.61
5902.00	28.00	181.70	5884.09	-105.22	-47.65	105.22	115.51	204.36	5.29
5933.00	29.40	182.00	5911.28	-120.10	-48.13	120.10	129.39	201.84	4.54
5965.00	30.30	182.30	5939.04	-136.02	-48.73	136.02	144.48	199.71	2.85
5997.00	30.00	180.00	5966.71	-152.08	-49.06	152.08	159.80	197.88	3.73
6029.00	33.40	177.70	5993.93	-168.89	-48.70	168.89	175.77	196.09	11.27
6060.00	35.00	176.80	6019.57	-186.29	-47.86	186.29	192.34	194.41	5.41
6092.00	38.80	175.20	6045.16	-205.45	-46.51	205.45	210.65	192.76	12.25

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	CLOSURE Direction Deg	Dogleg Severity Deg/100
6124.00	43.00	174.70	6069.34	-226.32	-44.66	226.32	230.68	191.16	13.16
6155.00	46.80	175.00	6091.29	-248.11	-42.70	248.11	251.76	189.77	12.28
6187.00	49.70	176.20	6112.60	-271.91	-40.88	271.91	274.96	188.55	9.48
6219.00	52.50	178.80	6132.69	-296.78	-39.80	296.78	299.44	187.64	10.79
6251.00	55.70	178.70	6151.46	-322.69	-39.24	322.69	325.07	186.93	10.00
6283.00	60.50	179.90	6168.36	-349.85	-38.91	349.85	352.01	186.35	15.33
6314.00	63.70	179.40	6182.86	-377.24	-38.74	377.24	379.23	185.86	10.42
6346.00	68.10	179.10	6195.93	-406.44	-38.36	406.44	408.25	185.39	13.78
6378.00	70.10	179.90	6207.34	-436.34	-38.10	436.34	438.00	184.99	6.67
6409.00	72.90	178.70	6217.18	-465.73	-37.74	465.73	467.25	184.63	9.75
6441.00	75.20	177.90	6225.97	-496.48	-36.82	496.48	497.84	184.24	7.58
6473.00	80.00	177.00	6232.84	-527.69	-35.43	527.69	528.88	183.84	15.25
6500.00	84.50	176.70	6236.48	-554.40	-33.96	554.40	555.44	183.51	16.70
Proj.									
6545.00	91.70	179.10	6237.97	-599.31	-32.32	599.31	600.18	183.09	16.86