



Job Number: P98-119
 Company: Netherland, Sewell & Associates, Inc.
 Lease/Well: 31-11 Steffen
 Location: Cunningham Gas Storage Field
 Rig Name: Unknown
 RKB: 1691'
 G.L. or M.S.L.: 1681'
 State/Country: Platt/Kingman Counties, Kansas
 Declination: 6.56° East (est.)
 Grid: Assumed True
 File name: D:\98110\S\98119\STEF3111.SVY
 Date/Time: 18-Sep-98 / 04:43
 Curve Name: Diamondback Surveys

ORIGINAL

Phoenix Drilling Services, Inc.

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 352.00
 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		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
3800.00	.24	325.57	3797.76	-74.41	2.69	-74.06	74.46	177.93	.00
3844.00	9.30	330.20	3841.56	-71.24	.87	-70.67	71.25	179.30	20.59
3876.00	19.80	336.80	3872.49	-64.00	-2.56	-63.02	64.05	182.29	33.17
3907.00	30.10	340.10	3900.56	-51.83	-7.29	-50.31	52.34	188.01	33.52
3939.00	38.70	349.70	3926.96	-34.39	-11.82	-32.41	36.37	198.97	31.70
3971.00	47.30	357.40	3950.36	-12.75	-14.15	-10.66	19.05	227.98	31.45
4003.00	57.00	356.70	3969.97	12.45	-15.46	14.48	19.85	308.86	30.36
4034.00	58.50	356.50	3986.51	38.62	-17.01	40.62	42.21	336.23	4.87
4066.00	60.90	355.70	4002.66	66.19	-18.90	68.17	68.83	344.07	7.80
4097.00	64.70	355.10	4016.83	93.66	-21.11	95.69	96.01	347.30	12.38

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	
4128.00	73.60	354.20	4027.85	122.48	-23.81	124.60	124.77	349.00	28.84
4160.00	81.50	354.00	4034.74	153.54	-27.02	155.80	155.90	350.02	24.70
4192.00	85.80	352.00	4038.28	185.09	-30.90	187.59	187.65	350.52	14.80
4223.00	85.50	351.10	4040.63	215.67	-35.44	218.50	218.56	350.67	3.05
4255.00	89.20	350.80	4042.11	247.23	-40.47	250.46	250.52	350.70	11.60
4286.00	89.30	352.20	4042.52	277.89	-45.05	281.45	281.51	350.79	4.53
4318.00	87.50	352.10	4043.41	309.57	-49.42	313.44	313.49	350.93	5.63
4349.00	87.60	351.70	4044.74	340.23	-53.78	344.41	344.46	351.02	1.33
4381.00	88.50	351.40	4045.82	371.87	-58.48	376.39	376.44	351.06	2.96
4412.00	89.60	352.70	4046.34	402.57	-62.77	407.38	407.43	351.14	5.49
4444.00	86.40	352.50	4047.45	434.28	-66.89	439.36	439.40	351.24	10.02
4476.00	86.50	352.30	4049.44	465.93	-71.11	471.30	471.33	351.32	.70
4507.00	87.20	352.30	4051.14	496.61	-75.26	502.25	502.28	351.38	2.26
4539.00	87.30	353.00	4052.68	528.31	-79.35	534.21	534.23	351.46	2.21
4570.00	88.00	353.30	4053.95	559.06	-83.04	565.18	565.19	351.55	2.46
4602.00	89.40	353.60	4054.67	590.84	-86.69	597.16	597.17	351.65	4.47
4633.00	88.80	354.40	4055.16	621.67	-89.93	628.13	628.14	351.77	3.23
4665.00	86.70	353.70	4056.42	653.47	-93.25	660.09	660.09	351.88	6.92
4696.00	86.90	352.10	4058.15	684.18	-97.07	691.03	691.04	351.92	5.19
4728.00	87.80	352.00	4059.63	715.84	-101.49	723.00	723.00	351.93	2.83
4759.00	87.80	352.10	4060.82	746.52	-105.78	753.98	753.98	351.94	.32
4790.00	87.20	352.80	4062.17	777.22	-109.85	784.95	784.95	351.96	2.97
4821.00	87.40	351.30	4063.63	807.89	-114.13	815.91	815.91	351.96	4.88
4851.00	88.00	350.90	4064.83	837.50	-118.77	845.88	845.88	351.93	2.40
4882.00	88.70	351.60	4065.72	868.13	-123.48	876.87	876.87	351.90	3.19
4914.00	89.60	351.20	4066.20	899.77	-128.27	908.86	908.86	351.89	3.08
4945.00	89.20	352.20	4066.52	930.44	-132.74	939.86	939.86	351.88	3.47
4976.00	88.80	352.20	4067.06	961.15	-136.95	970.86	970.86	351.89	1.29
5008.00	89.10	352.70	4067.65	992.87	-141.15	1002.85	1002.85	351.91	1.82
5039.00	90.50	353.70	4067.76	1023.65	-144.82	1033.84	1033.84	351.95	5.55
5071.00	89.50	352.70	4067.76	1055.42	-148.61	1065.83	1065.83	351.99	4.42
5102.00	90.20	352.80	4067.84	1086.17	-152.52	1096.83	1096.83	352.01	2.28

ORIGINAL

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	
5133.00	89.70	353.10	4067.87	1116.94	-156.33	1127.82	352.03	1127.82	1.88
5164.00	90.30	353.20	4067.87	1147.72	-160.02	1158.82	352.06	1158.82	1.96
5195.00	90.20	354.20	4067.73	1178.53	-163.43	1189.80	352.11	1189.81	3.24
5227.00	90.50	354.60	4067.54	1210.37	-166.55	1221.77	352.17	1221.78	1.56
5258.00	90.90	354.00	4067.16	1241.22	-169.63	1252.75	352.22	1252.76	2.33
5290.00	90.00	352.90	4066.91	1273.01	-173.28	1284.73	352.25	1284.75	4.44
5320.00	87.90	353.10	4067.46	1302.78	-176.93	1314.72	352.27	1314.74	7.03
5352.00	88.60	353.30	4068.43	1334.54	-180.72	1346.70	352.29	1346.72	2.27
5383.00	87.30	352.40	4069.54	1365.28	-184.58	1377.68	352.30	1377.70	5.10
5415.00	86.50	352.30	4071.27	1396.94	-188.83	1409.63	352.30	1409.65	2.52
5446.00	86.00	351.30	4073.30	1427.56	-193.24	1440.56	352.29	1440.58	3.60
5478.00	88.30	350.90	4074.89	1459.13	-198.19	1472.52	352.27	1472.53	7.30
5508.00	93.90	349.80	4074.32	1488.69	-203.21	1502.49	352.23	1502.50	19.02
5539.00	92.60	349.80	4072.56	1519.15	-208.69	1533.41	352.18	1533.42	4.19
5571.00	90.90	349.20	4071.58	1550.60	-214.52	1565.37	352.12	1565.37	5.63
5602.00	90.90	348.30	4071.09	1581.00	-220.57	1596.31	352.06	1596.31	2.90
5632.00	92.10	348.30	4070.31	1610.37	-226.65	1626.24	351.99	1626.24	4.00
5663.00	94.00	347.40	4068.66	1640.63	-233.16	1657.11	351.91	1657.11	6.78
5694.00	93.90	348.10	4066.52	1670.85	-239.73	1687.95	351.84	1687.96	2.28
5725.00	94.90	349.70	4064.15	1701.18	-245.68	1718.82	351.78	1718.83	6.07

ORIGINAL

Projected Survey to TD			
5757.00	95.90	351.40	4061.13
		1732.60	1750.66
		-250.91	1750.68
			351.76
			6.14