

Williams Production Co. - San Juan Basin

New Mexico
Rio Arriba County 30-039-27242
Sec. 1-T31N-R6W
Rosa Unit 164-B MWD & Single-Shot Survey

Surface: 1475/S 1235/E Sec 1, 31N 6W
BHL: 465/S 1077/W "

SURVEY REPORT

NS/DK

8 October, 2002



sperry-sun
DRILLING SERVICES
A Halliburton Company

Survey Ref: svy7670

Sperry-Sun Drilling Services

Survey Report for Rosa Unit 164-B MWD & Single-Shot Survey



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New Mexico

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Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00	
563.00	1.000	206.300	562.97	4.40 S	2.18 W	4.35	0.178
654.00	2.600	227.800	653.92	6.50 S	4.06 W	7.10	1.878
744.00	6.000	234.500	743.66	10.61 S	9.40 W	13.84	3.812
835.00	7.100	234.600	834.06	16.63 S	17.86 W	24.22	1.209
928.00	9.300	230.600	926.11	24.73 S	28.35 W	37.47	2.442
1023.00	11.200	230.700	1019.59	35.44 S	41.42 W	54.34	2.000
1118.00	13.200	235.100	1112.44	47.49 S	57.46 W	74.40	2.320
1210.00	14.900	234.600	1201.68	60.36 S	75.72 W	96.73	1.853
1305.00	17.300	232.900	1292.95	75.96 S	96.94 W	123.07	2.574
1395.00	19.600	234.400	1378.32	92.82 S	119.89 W	151.55	2.609
1487.00	22.800	232.000	1464.08	112.78 S	146.49 W	184.81	3.603
1578.00	25.400	232.300	1547.14	135.57 S	175.84 W	221.94	2.860
1670.00	28.600	233.700	1629.11	160.68 S	209.20 W	263.69	3.546
1763.00	30.600	236.700	1709.97	186.86 S	246.93 W	309.60	2.676
1859.00	32.700	236.600	1791.69	214.55 S	289.01 W	359.92	2.188
1952.00	36.800	235.300	1868.09	244.25 S	332.90 W	412.89	4.480
2046.00	39.500	235.500	1942.00	277.22 S	380.69 W	470.93	2.875
2139.00	41.500	234.400	2012.72	311.91 S	430.13 W	531.32	2.284
2232.00	41.800	234.600	2082.21	347.80 S	480.45 W	593.12	0.353
2326.00	42.400	234.600	2151.95	384.31 S	531.81 W	656.14	0.638
2418.00	41.300	234.300	2220.48	419.99 S	581.75 W	717.52	1.215
2512.00	42.100	234.600	2290.67	456.35 S	632.63 W	780.05	0.877
2605.00	41.000	235.500	2360.26	491.69 S	683.19 W	841.72	1.346
2699.00	41.900	235.100	2430.72	527.11 S	734.34 W	903.93	0.998
2792.00	41.000	233.900	2500.43	562.86 S	784.46 W	965.48	1.291
2885.00	41.900	233.700	2570.13	599.22 S	834.14 W	1027.05	0.978
2980.00	41.100	234.600	2641.28	636.09 S	885.16 W	1089.99	1.050
3075.00	40.700	234.200	2713.09	672.29 S	935.73 W	1152.19	0.503
3167.00	40.400	233.900	2782.99	707.41 S	984.15 W	1212.00	0.389
3259.00	41.900	234.300	2852.27	742.90 S	1033.19 W	1272.54	1.655
3353.00	42.500	234.100	2921.90	779.84 S	1084.40 W	1335.68	0.654
3446.00	40.600	235.100	2991.50	815.57 S	1134.67 W	1397.36	2.164
3539.00	38.800	235.100	3063.05	849.56 S	1183.39 W	1456.75	1.935
3665.00	34.900	236.000	3163.86	892.32 S	1245.68 W	1532.27	3.125
3758.00	33.100	234.900	3240.96	921.80 S	1288.51 W	1584.26	2.045
3853.00	31.700	235.000	3321.17	951.04 S	1330.18 W	1635.15	1.475
3946.00	29.700	233.400	3401.13	978.79 S	1368.70 W	1682.62	2.323
4039.00	26.900	232.700	3483.01	1005.28 S	1403.94 W	1726.70	3.032
4132.00	22.300	232.200	3567.54	1028.86 S	1434.63 W	1765.39	4.951
4224.00	19.800	233.300	3653.40	1048.87 S	1460.92 W	1798.43	2.751
4318.00	17.000	235.300	3742.58	1066.21 S	1484.99 W	1828.09	3.053
4409.00	13.400	233.600	3830.39	1080.05 S	1504.42 W	1851.94	3.986
4480.00	10.400	234.300	3899.85	1088.67 S	1516.25 W	1866.58	4.230
5011.00	12.250	260.800	4420.84	1125.67 S	1610.85 W	1964.87	1.029

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Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5481.00	12.000	275.800	4880.47	1128.71 S	1708.71 W	2045.84	0.671
5978.00	11.000	280.800	5367.50	1114.60 S	1806.69 W	2116.84	0.284
6476.00	11.000	285.800	5856.36	1092.76 S	1899.08 W	2178.77	0.192
6966.00	9.500	281.800	6338.53	1071.76 S	1983.65 W	2234.87	0.339
7466.00	7.250	283.800	6833.17	1055.80 S	2054.68 W	2282.98	0.454
7938.00	6.000	290.800	7302.02	1039.93 S	2106.67 W	2315.73	0.315
8601.00	4.000	310.800	7962.51	1012.51 S	2156.58 W	2340.00	0.396
8664.00	4.000	310.800	8025.35	1009.64 S	2159.90 W	2341.01	0.000

All data is in Feet (US) unless otherwise stated. Directions and coordinates are relative to True North.
Vertical depths are relative to Structure. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100 feet (US).
Vertical Section is from Well and calculated along an Azimuth of 234.020° (True).

Based upon Minimum Curvature type calculations, at a Measured Depth of 8664.00ft.,
The Bottom Hole Displacement is 2384.23ft., in the Direction of 244.946° (True).

Comments

Measured Depth (ft)	TVD (ft)	Northings (ft)	Eastings (ft)	Comment
563.00	562.97	4.40 S	2.18 W	First MWD Survey
4480.00	3899.85	1088.67 S	1516.25 W	Final MWD Survey
5011.00	4420.84	1125.67 S	1610.85 W	Surveys from 5011' through 8601' are Single-Shot Surveys
8664.00	8025.35	1009.64 S	2159.90 W	Survey Projection to TD