

Williams Production

**Williams Production
Rio Arriba County
Sec. 34-T32N-R06W, Slot Rosa Unit 89C
Rosa Unit 89C - MWD Surveys**

30-039-26674
SR 5 1970/N 1250/E
BNL 1562/N 2628/W

SURVEY REPORT

13 August, 2001

**Surface Coordinates: 0.00 N, 0.00 E
Surface Coordinates relative to Global Coordinates: 0.00 N, 0.00 E (Grid)
Surface Coordinates relative to Structure: 0.00 N, 0.00 E (True)
Kelly Bushing: 0.00ft above Mean Sea Level**

sperry-sun
DRILLING SERVICES
A Halliburton Company

Survey Ref: svy1440

Sperry-Sun Drilling Services

Survey Report for Rosa Unit 89C - MWD Surveys

Williams Production
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Rio Arriba County
Sec. 34-T32N-R06W

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
515.00	0.000	0.000	515.00	0.00 N	0.00 E	0.00	
529.00	0.400	123.400	529.00	0.03 S	0.04 E	-0.05	2.857
560.00	0.400	115.300	560.00	0.13 S	0.23 E	-0.25	0.182
590.00	0.200	311.000	590.00	0.14 S	0.28 E	-0.31	1.983
620.00	1.700	292.200	619.99	0.06 N	0.17 W	0.18	5.040
650.00	3.600	292.100	649.96	0.58 N	1.45 W	1.54	6.333
681.00	5.500	295.700	680.86	1.59 N	3.69 W	3.95	6.195
711.00	7.000	293.800	710.88	2.95 N	6.66 W	7.15	5.047
741.00	8.100	290.500	740.42	4.43 N	10.31 W	11.03	3.940
771.00	9.100	287.300	770.08	5.88 N	14.56 W	15.49	3.694
801.00	9.400	285.700	799.69	7.25 N	19.18 W	20.30	1.317
832.00	9.800	282.200	830.26	8.49 N	24.20 W	25.47	2.282
861.00	9.800	280.100	858.84	9.44 N	29.04 W	30.40	1.232
892.00	10.500	280.300	889.35	10.41 N	34.42 W	35.86	2.261
922.00	11.500	279.200	918.80	11.38 N	40.06 W	41.58	3.406
952.00	12.500	282.700	948.14	12.57 N	46.18 W	47.81	4.121
984.00	13.400	285.200	979.33	14.30 N	53.13 W	54.97	3.312
1015.00	14.500	286.400	1009.42	16.34 N	60.32 W	62.44	3.869
1046.00	15.900	284.700	1039.33	18.51 N	68.15 W	70.55	4.739
1077.00	17.200	284.300	1069.05	20.72 N	76.70 W	79.38	4.210
1108.00	18.300	283.600	1098.57	23.00 N	85.88 W	88.83	3.614
1138.00	19.300	283.400	1126.97	25.26 N	95.28 W	98.49	3.340
1168.00	20.300	283.800	1155.20	27.65 N	105.15 W	108.65	3.364
1199.00	20.900	283.300	1184.21	30.20 N	115.76 W	119.56	2.017
1231.00	21.200	283.300	1214.08	32.85 N	126.94 W	131.05	0.938
1261.00	21.200	284.000	1242.05	35.41 N	137.48 W	141.90	0.844
1293.00	21.400	284.000	1271.86	38.22 N	148.76 W	153.52	0.625
1322.00	21.900	283.300	1298.82	40.74 N	159.16 W	164.22	1.941
1353.00	21.800	281.700	1327.59	43.24 N	170.42 W	175.75	1.948
1383.00	22.200	280.600	1355.40	45.41 N	181.45 W	186.99	1.914
1415.00	22.500	280.300	1385.00	47.62 N	193.42 W	199.15	1.003
1445.00	21.700	280.500	1412.80	49.66 N	204.52 W	210.42	2.678
1477.00	22.000	280.600	1442.50	51.84 N	216.23 W	222.33	0.945
1507.00	21.900	280.900	1470.32	53.93 N	227.24 W	233.53	0.501
1538.00	21.400	280.300	1499.14	56.03 N	238.48 W	244.96	1.764
1570.00	21.500	281.000	1528.92	58.20 N	249.98 W	256.66	0.859
1599.00	21.500	282.200	1555.90	60.33 N	260.40 W	267.29	1.517
1630.00	21.500	281.500	1584.74	62.67 N	271.51 W	278.65	0.828
1660.00	21.800	281.500	1612.63	64.87 N	282.36 W	289.71	1.000
1691.00	21.900	282.000	1641.40	67.22 N	293.66 W	301.25	0.681
1722.00	21.400	282.000	1670.21	69.60 N	304.84 W	312.68	1.613
1754.00	21.200	282.600	1700.03	72.08 N	316.20 W	324.31	0.924
1785.00	21.000	282.700	1728.95	74.52 N	327.09 W	335.47	0.656
1816.00	20.600	282.600	1757.93	76.93 N	337.83 W	346.48	1.295
1846.00	20.500	282.600	1786.02	79.23 N	348.11 W	357.01	0.333

Sperry-Sun Drilling Services

Survey Report for Rosa Unit 89C - MWD Surveys

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Rio Arriba County
Sec. 34-T32N-R06W

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
1877.00	20.900	282.400	1815.02	81.60 N	358.81 W	367.96	1.310
1909.00	21.200	282.400	1844.88	84.07 N	370.03 W	379.46	0.938
1940.00	21.400	283.300	1873.77	86.57 N	381.01 W	390.72	1.236
1972.00	20.900	282.600	1903.61	89.16 N	392.26 W	402.26	1.751
2002.00	20.900	282.700	1931.64	91.50 N	402.70 W	412.97	0.119
2033.00	21.400	282.700	1960.55	93.96 N	413.62 W	424.15	1.613
2065.00	21.700	283.100	1990.31	96.59 N	425.07 W	435.91	1.044
2094.00	21.200	283.400	2017.30	99.02 N	435.39 W	446.51	1.765
2125.00	20.700	282.700	2046.25	101.52 N	446.19 W	457.59	1.804
2155.00	20.700	284.000	2074.32	103.97 N	456.51 W	468.20	1.532
2187.00	20.600	283.800	2104.26	106.68 N	467.46 W	479.48	0.382
2218.00	20.700	284.100	2133.27	109.32 N	478.07 W	490.41	0.470
2250.00	20.900	284.700	2163.18	112.14 N	489.08 W	501.76	0.913
2281.00	20.900	284.300	2192.14	114.91 N	499.79 W	512.82	0.460
2313.00	20.700	283.400	2222.06	117.63 N	510.82 W	524.18	1.178
2344.00	20.100	282.900	2251.11	120.09 N	521.34 W	534.98	2.015
2374.00	20.000	280.800	2279.30	122.20 N	531.41 W	545.27	2.423
2405.00	19.900	280.100	2308.44	124.12 N	541.81 W	555.84	0.835
2435.00	20.000	281.500	2336.64	126.04 N	551.86 W	566.07	1.627
2466.00	20.100	281.200	2365.76	128.13 N	562.28 W	576.69	0.463
2498.00	20.400	281.500	2395.78	130.31 N	573.14 W	587.76	0.992
2529.00	21.100	282.200	2424.77	132.57 N	583.89 W	598.75	2.396
2560.00	21.200	282.600	2453.68	134.97 N	594.81 W	609.93	0.566
2591.00	21.200	281.900	2482.58	137.35 N	605.77 W	621.14	0.817
2621.00	21.700	281.700	2510.50	139.59 N	616.51 W	632.11	1.684
2652.00	21.800	280.800	2539.30	141.83 N	627.77 W	643.59	1.123
2682.00	21.600	280.500	2567.17	143.88 N	638.67 W	654.68	0.762
2712.00	21.400	281.300	2595.08	145.96 N	649.47 W	665.67	1.183
2744.00	20.800	280.100	2624.94	148.10 N	660.79 W	677.18	2.310
2775.00	21.400	281.500	2653.86	150.19 N	671.75 W	688.34	2.528
2807.00	21.300	280.500	2683.66	152.42 N	683.19 W	699.98	1.180
2837.00	20.800	281.200	2711.66	154.44 N	693.77 W	710.75	1.865
2868.00	20.700	280.800	2740.65	156.54 N	704.55 W	721.73	0.560
2900.00	20.200	280.100	2770.63	158.57 N	715.54 W	732.90	1.739
2931.00	20.200	279.900	2799.73	160.43 N	726.09 W	743.60	0.223
2962.00	20.000	281.000	2828.84	162.36 N	736.56 W	754.24	1.380
2994.00	20.200	281.500	2858.89	164.50 N	747.35 W	765.24	0.824
3025.00	20.000	283.400	2888.00	166.80 N	757.75 W	775.89	2.203
3056.00	19.900	283.300	2917.14	169.24 N	768.04 W	786.46	0.341
3087.00	19.800	283.600	2946.30	171.69 N	778.28 W	796.99	0.460
3118.00	19.800	283.600	2975.47	174.16 N	788.49 W	807.49	0.000
3149.00	20.000	284.100	3004.62	176.69 N	798.73 W	818.04	0.847
3180.00	19.900	284.500	3033.76	179.30 N	808.98 W	828.61	0.546
3211.00	20.000	284.500	3062.90	181.95 N	819.22 W	839.18	0.323
3243.00	20.300	284.300	3092.94	184.69 N	829.90 W	850.20	0.962

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Sec. 34-T32N-R06W

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
3274.00	20.400	283.600	3122.00	187.29 N	840.36 W	860.98	0.849
3304.00	21.000	283.100	3150.07	189.73 N	850.68 W	871.58	2.085
3336.00	21.400	282.700	3179.90	192.32 N	861.96 W	883.15	1.329
3368.00	20.900	282.000	3209.75	194.79 N	873.24 W	894.70	1.751
3400.00	20.800	282.000	3239.65	197.16 N	884.38 W	906.09	0.313
3432.00	21.000	281.500	3269.54	199.48 N	895.55 W	917.50	0.837
3463.00	20.100	281.200	3298.57	201.62 N	906.22 W	928.38	2.923
3494.00	19.600	281.200	3327.73	203.67 N	916.55 W	938.90	1.613
3525.00	19.600	281.000	3356.93	205.67 N	926.75 W	949.30	0.216
3557.00	19.700	282.000	3387.07	207.81 N	937.30 W	960.06	1.096
3587.00	18.500	283.400	3415.42	209.97 N	946.87 W	969.87	4.281
3618.00	18.600	284.000	3444.81	212.31 N	956.45 W	979.73	0.695
3650.00	18.800	284.100	3475.12	214.80 N	966.41 W	989.99	0.633
3681.00	18.800	284.100	3504.46	217.23 N	976.10 W	999.98	0.000
3712.00	18.900	284.500	3533.80	219.70 N	985.80 W	1009.99	0.527
3742.00	18.700	285.200	3562.20	222.18 N	995.15 W	1019.65	1.005
3773.00	18.600	285.700	3591.57	224.82 N	1004.70 W	1029.55	0.608
3805.00	18.500	285.000	3621.91	227.52 N	1014.52 W	1039.72	0.763
3837.00	18.500	285.500	3652.26	230.19 N	1024.31 W	1049.86	0.496
3868.00	18.400	286.300	3681.66	232.88 N	1033.75 W	1059.65	0.878
3900.00	18.400	285.400	3712.03	235.63 N	1043.47 W	1069.74	0.888
3932.00	18.300	285.900	3742.40	238.35 N	1053.17 W	1079.80	0.583
3963.00	17.800	285.400	3771.87	240.94 N	1062.42 W	1089.39	1.689
3995.00	17.500	283.900	3802.37	243.40 N	1071.80 W	1099.08	1.703
4025.00	17.100	283.300	3831.01	245.50 N	1080.47 W	1108.00	1.460
4057.00	16.400	283.800	3861.65	247.66 N	1089.44 W	1117.23	2.233
4088.00	15.900	282.900	3891.43	249.65 N	1097.83 W	1125.85	1.804
4119.00	15.700	283.100	3921.26	251.55 N	1106.05 W	1134.29	0.669
4151.00	15.900	281.300	3952.05	253.39 N	1114.57 W	1143.00	1.654
4182.00	15.700	279.900	3981.88	254.94 N	1122.86 W	1151.43	1.389
4214.00	15.000	278.700	4012.74	256.31 N	1131.22 W	1159.89	2.402
4245.00	13.800	279.400	4042.76	257.52 N	1138.83 W	1167.58	3.911
4276.00	12.400	281.300	4072.96	258.78 N	1145.75 W	1174.60	4.724
4308.00	11.300	281.900	4104.27	260.10 N	1152.18 W	1181.17	3.459
4339.00	10.000	283.400	4134.74	261.35 N	1157.77 W	1186.90	4.287
4541.00	13.250	296.000	4332.60	275.57 N	1195.66 W	1226.98	2.033
4603.00	15.250	298.000	4392.69	282.51 N	1209.24 W	1241.75	3.322
4666.00	14.900	299.000	4453.52	290.33 N	1223.64 W	1257.51	0.692
4730.00	13.250	300.000	4515.60	297.98 N	1237.19 W	1272.40	2.606
4791.00	12.250	303.000	4575.09	305.00 N	1248.68 W	1285.14	1.966
4854.00	11.750	305.000	4636.72	312.32 N	1259.54 W	1297.34	1.032
4916.00	10.500	306.000	4697.55	319.26 N	1269.28 W	1308.36	2.040
5010.00	9.250	307.000	4790.16	328.85 N	1282.24 W	1323.10	1.342
5103.00	8.000	306.000	4882.10	337.15 N	1293.45 W	1335.85	1.354
5165.00	7.500	310.000	4943.54	342.29 N	1300.04 W	1343.40	1.186

Sperry-Sun Drilling Services

Survey Report for Rosa Unit 89C - MWD Surveys

Williams Production
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Rio Arriba County
Sec. 34-T32N-R06W

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5259.00	7.250	306.000	5036.76	349.71 N	1309.54 W	1354.29	0.607
5353.00	6.250	311.000	5130.11	356.56 N	1318.20 W	1364.24	1.233
5478.00	5.250	307.000	5254.48	364.46 N	1327.90 W	1375.43	0.861
5603.00	4.750	313.000	5379.00	371.44 N	1336.25 W	1385.10	0.578
5729.00	4.250	309.000	5504.61	377.93 N	1343.69 W	1393.79	0.468
5887.00	4.500	320.000	5662.16	386.36 N	1352.23 W	1403.95	0.553
6041.00	3.750	318.000	5815.76	394.74 N	1359.48 W	1412.86	0.496
6197.00	3.000	316.000	5971.49	401.46 N	1365.73 W	1420.43	0.487
6324.00	2.750	315.000	6098.33	406.01 N	1370.19 W	1425.77	0.201
6380.00	2.750	315.000	6154.26	407.91 N	1372.09 W	1428.04	0.000

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

The Dogleg Severity is in Degrees per 100 feet.
Vertical Section is from Well and calculated along an Azimuth of 282.606° (True).

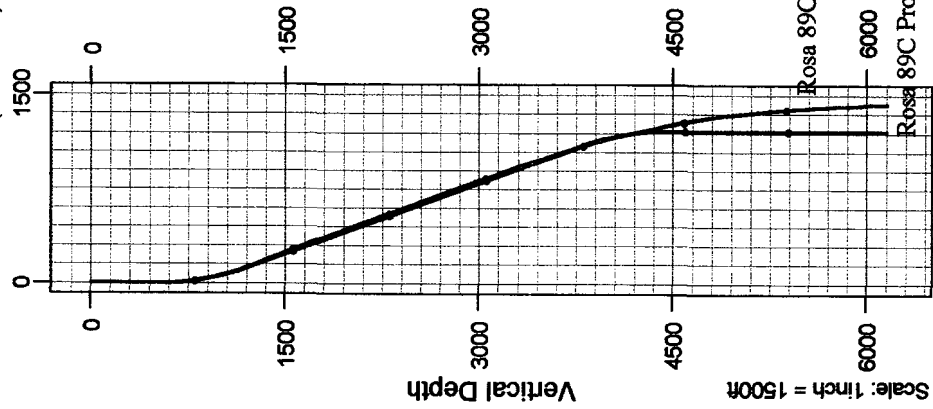
Based upon Minimum Curvature type calculations, at a Measured Depth of 6380.00ft.,
The Bottom Hole Displacement is 1431.44ft., in the Direction of 286.557° (True).

Comments

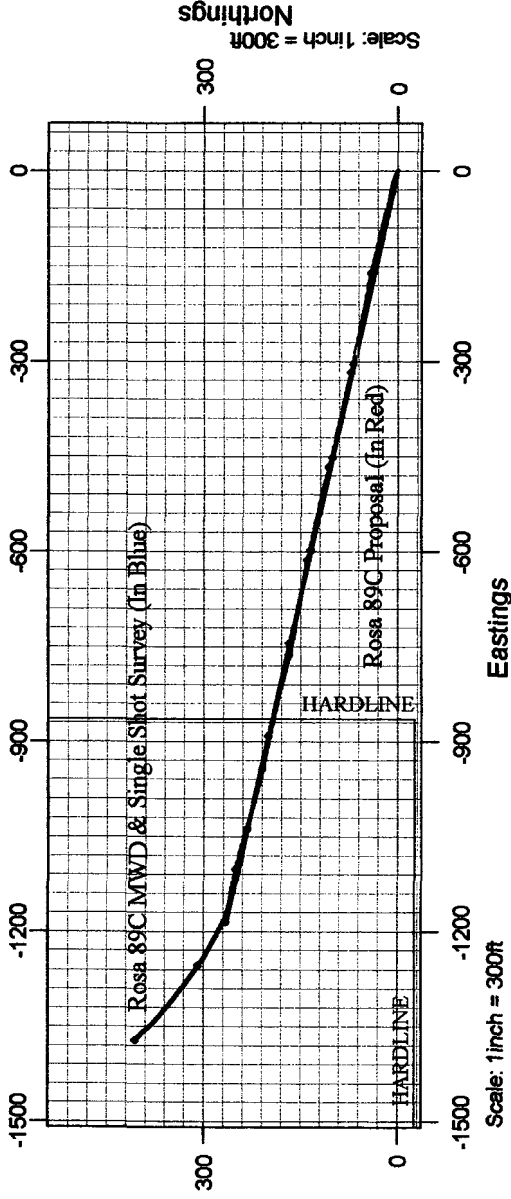
Measured Depth (ft)	Station TVD (ft)	Coordinates Northings (ft)	Eastings (ft)	Comment
515.00	515.00	0.00 N	0.00 E	Surface Casing
529.00	529.00	0.03 S	0.04 E	First SSDS MWD Survey
4339.00	4134.74	261.35 N	1157.77 W	Final SSDS MWD Survey
4402.00	4196.69	264.48 N	1168.78 W	7" Casing Point
4541.00	4332.60	275.57 N	1195.66 W	First SSDS SS Survey
6324.00	6098.33	406.01 N	1370.19 W	Final SSDS SS Survey
6380.00	6154.26	407.91 N	1372.09 W	Projected to Bit @ TD

New Mexico
Rio Arriba County
Sec.34-T32N-R06W
Rosa Unit 89C

Section Azimuth: 282.606° (True North)



Section Azimuth: 282.606° (True North)



Scale: 1 inch = 1500ft
Vertical Section

Prepared by: Jay Lantz
 Date/Time: 21 September, 2001 - 11:11
 Checked:
 Approved: