

Williams Production Company

New Mexico

Rio Arriba County

Sec. 6-T31N-R5W

Rosa Unit #171-C MWD & Single-Shot Survey

30-039-27241

Sr L. 720/S 1245/E

BHL 200/N 11/W Sec 9 T31N R5W

SURVEY REPORT

7 August, 2002

sperry-sun
DRILLING SERVICES
A Halliburton Company

Survey Ref: svy7574

Sperry-Sun Drilling Services

Survey Report for Rosa Unit #171-C MWD & Single-Shot Survey



Williams Production Company
New Mexico

Rio Arriba County
Sec. 6-T31N-R5W

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	
288.00	0.000	0.000	288.00	0.00 N	0.00 E	0.00	0.000
321.00	0.500	308.800	321.00	0.09 N	0.11 W	0.06	1.515
442.00	1.100	242.000	441.99	0.12 S	1.55 W	1.45	0.837
502.00	1.800	245.500	501.97	0.79 S	2.92 W	2.97	1.175
562.00	2.900	236.900	561.92	2.01 S	5.04 W	5.42	1.920
622.00	4.400	239.400	621.80	4.01 S	8.30 W	9.21	2.513
682.00	6.200	241.800	681.54	6.71 S	13.13 W	14.74	3.022
742.00	8.000	240.200	741.07	10.31 S	19.61 W	22.14	3.018
803.00	10.100	242.900	801.31	14.86 S	28.06 W	31.72	3.511
863.00	12.000	244.100	860.20	19.98 S	38.35 W	43.21	3.190
924.00	14.200	245.700	919.61	25.83 S	50.88 W	57.04	3.655
986.00	16.000	244.300	979.46	32.67 S	65.51 W	73.19	2.962
1049.00	18.300	243.800	1039.66	40.80 S	82.21 W	91.76	3.658
1110.00	20.400	244.600	1097.21	49.59 S	100.41 W	111.97	3.470
1173.00	23.100	245.700	1155.72	59.39 S	121.60 W	135.31	4.334
1235.00	25.800	247.100	1212.15	69.65 S	145.11 W	160.96	4.454
1297.00	28.600	246.400	1267.29	80.84 S	171.15 W	189.28	4.545
1359.00	31.300	247.600	1321.01	92.92 S	199.64 W	220.20	4.461
1421.00	33.800	246.600	1373.27	105.91 S	230.36 W	253.53	4.124
1482.00	36.800	246.800	1423.04	119.85 S	262.73 W	288.76	4.922
1543.00	39.800	246.800	1470.91	134.74 S	297.48 W	326.54	4.918
1604.00	42.400	245.700	1516.87	150.90 S	334.17 W	366.62	4.424
1667.00	43.600	244.100	1562.95	169.13 S	373.08 W	409.58	2.574
1729.00	44.700	243.200	1607.44	188.30 S	411.77 W	452.75	2.042
1791.00	45.200	242.900	1651.31	208.15 S	450.82 W	496.54	0.876
1854.00	45.900	242.900	1695.43	228.64 S	490.85 W	541.49	1.111
1917.00	45.400	242.900	1739.47	249.16 S	530.96 W	586.51	0.794
1980.00	44.600	241.500	1784.02	269.93 S	570.36 W	631.01	2.020
2074.00	43.800	241.500	1851.41	301.20 S	627.95 W	696.44	0.851
2168.00	42.400	242.200	1920.04	331.50 S	684.58 W	760.58	1.574
2259.00	43.000	241.700	1986.92	360.53 S	739.04 W	822.21	0.757
2354.00	43.400	242.400	2056.17	391.00 S	796.49 W	887.17	0.657
2446.00	43.600	243.200	2122.91	419.95 S	852.81 W	950.46	0.637
2540.00	44.300	242.900	2190.58	449.52 S	910.97 W	1015.67	0.777
2632.00	43.900	243.400	2256.65	478.44 S	968.09 W	1079.66	0.576
2725.00	44.700	243.800	2323.21	507.31 S	1026.27 W	1144.60	0.911
2850.00	43.900	243.400	2412.67	546.13 S	1104.46 W	1231.88	0.678
2943.00	42.800	245.500	2480.30	573.67 S	1162.05 W	1295.71	1.950
3037.00	43.800	245.200	2548.71	600.56 S	1220.64 W	1360.18	1.086
3129.00	42.800	244.600	2615.66	627.32 S	1277.78 W	1423.27	1.175
3223.00	43.200	246.400	2684.41	653.90 S	1336.11 W	1487.37	1.373
3318.00	42.000	246.400	2754.34	679.64 S	1395.03 W	1551.64	1.263
3411.00	41.300	246.900	2823.83	704.14 S	1451.78 W	1613.42	0.833
3504.00	41.700	246.000	2893.49	728.76 S	1508.26 W	1675.01	0.772

Sperry-Sun Drilling Services

Survey Report for Rosa Unit #171-C MWD & Single-Shot Survey



Williams Production Company
New Mexico

Rio Arriba County
Sec. 6-T31N-R5W

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
3599.00	42.700	246.200	2963.86	754.62 S	1566.61 W	1738.81	1.062
3692.00	40.200	246.900	3033.56	779.12 S	1623.07 W	1800.34	2.734
3787.00	39.700	247.600	3106.39	802.71 S	1679.33 W	1861.28	0.708
3880.00	39.900	246.000	3177.84	826.16 S	1734.04 W	1920.77	1.122
3910.00	41.000	245.000	3200.67	834.24 S	1751.75 W	1940.23	4.257
3973.00	42.000	241.400	3247.86	853.06 S	1788.99 W	1981.95	4.105
4036.00	41.900	241.100	3294.72	873.32 S	1825.91 W	2023.98	0.356
4099.00	39.600	240.300	3342.44	893.44 S	1861.78 W	2065.00	3.744
4161.00	36.600	240.100	3391.23	912.45 S	1894.97 W	2103.13	4.843
4223.00	33.800	240.200	3441.88	930.23 S	1925.97 W	2138.74	4.517
4285.00	32.800	241.100	3493.70	946.92 S	1955.63 W	2172.69	1.799
4348.00	30.500	241.700	3547.33	962.75 S	1984.65 W	2205.69	3.685
4410.00	27.200	242.700	3601.63	976.71 S	2011.10 W	2235.57	5.379
4471.00	23.800	244.300	3656.68	988.45 S	2034.59 W	2261.82	5.687
4535.00	22.100	244.600	3715.61	999.21 S	2057.10 W	2286.77	2.663
4594.00	20.100	244.100	3770.65	1008.40 S	2076.25 W	2308.01	3.404
4655.00	17.000	247.100	3828.48	1016.45 S	2093.90 W	2327.41	5.316
4716.00	15.200	250.600	3887.08	1022.58 S	2109.66 W	2344.27	3.351
4779.00	12.800	253.600	3948.21	1027.29 S	2124.15 W	2359.39	3.979
5067.00	15.100	275.800	4227.89	1032.51 S	2192.13 W	2423.12	2.007
5289.00	20.000	269.200	4439.52	1030.12 S	2258.90 W	2482.52	2.379
5379.00	17.500	279.200	4524.76	1028.17 S	2287.66 W	2507.71	4.515
5510.00	16.500	282.200	4650.03	1021.09 S	2325.29 W	2538.73	1.015
5791.00	13.250	292.200	4921.63	1000.48 S	2394.14 W	2592.25	1.470
6169.00	7.500	299.200	5293.30	972.05 S	2455.84 W	2635.96	1.555
6990.00	7.500	299.200	6107.28	919.77 S	2549.38 W	2698.32	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 (US).
Vertical Section is from Well and calculated along an Azimuth of 244.790° (True).

Based upon Minimum Curvature type calculations, at a Measured Depth of 6990.00ft.,
The Bottom Hole Displacement is 2710.23ft., in the Direction of 250.161° (True).

Sperry-Sun Drilling Services
Survey Report for Rosa Unit #171-C MWD & Single-Shot Survey



Williams Production Company
New Mexico

Rio Arriba County
Sec. 6-T31N-R5W

Comments

Measured Depth (ft)	Station Coordinates			Comment
	TVD (ft)	Northings (ft)	Eastings (ft)	
288.00	288.00	0.00 N	0.00 E	Surface Casing Assumed Vertical at 288'
321.00	321.00	0.09 N	0.11 W	First MWD Survey
4779.00	3948.21	1027.29 S	2124.15 W	Final MWD Survey
5067.00	4227.89	1032.51 S	2192.13 W	Surveys from 5067' through 6169' are Single-Shot Surveys
6990.00	6107.28	919.77 S	2549.38 W	Survey Projection to TD

SPERRY-SUN DRILLING SERVICES

CERTIFIED SURVEY WORK SHEET

OPERATOR:	Williams Production Co.
WELL:	Rosa Unit #171-C
FIELD:	Blanco Mesa Verde
RIG:	Aztec Well Serv. #222
LEGAL:	Sec. 6 -T31N - R5W
COUNTRY:	Rio Arriba
STATE:	New Mexico
CAL. METHOD:	Minimum Curvature
MAG. DECL. APPLIED:	10.864°
VERTICAL SEC. DIR. :	244.790°



SSDS Job Number :	CA-MJ-20114
Start Date of Job :	07/19/02
End Date of Job :	07/26/02
Lead Directional Driller:	Justin Lee Groom
Other SSDS DD's :	Lloyd Berrard
SSDS MWD Engineers :	Rob Ausbrooks Anthony Knight

Well Head	Main Hole	1st Side Track	2nd Side Track	3rd Side Track	4th Side Track
Surface Csg. Shoe	0.00 Tie On				
First Survey Depth	288.00 NA				
Last Survey Depth	321.00 MWD				
	4778.00 MWD				
KOP Depth/Sidetrack MD	500.00 KOP	KOP-ST1	KOP-ST2	KOP-ST3	KOP-ST4
Intermediate Csg. Shoe					
First Survey Depth					
Last Survey Depth					
Bit Extrapolation to TD	4831.00 T.D.	T.D.	T.D.	T.D.	T.D.

The following Sperry-Sun Drilling Services personnel certify this information is accurate to the best of our knowledge:

Print Name : <u>Lloyd Berrard</u>	Print Name : <u>Justin Lee Groom</u>	Print Name : _____
Sign Name : <u>[Signature]</u>	Sign Name : <u>[Signature]</u>	Sign Name : _____
Print Name : <u>Rob Ausbrooks</u>	Print Name : _____	Print Name : _____
Sign Name : <u>[Signature]</u>	Sign Name : _____	Sign Name : _____

Examples of
Survey Types:

Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)
 MWD Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's
 ESS Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's
 Gyro Survey's : Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)
 SS Single Shot (SS) Survey's : Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.