

Customer : Williams Production Company

Well : Rosa Unit #167

Rig : Aztec #124

Field : Mesa Verde

Legal : K Sec. 8 - T³¹N - R⁶6W

County : Rio Arriba

State : New Mexico

Calculation Method :

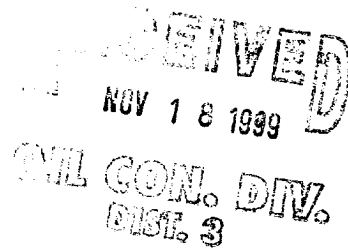
Magnetic Declination Applied :

Vertical Section Direction :

Minimum Curvature

11.3° East

104.95° Azimuth



Note : See attached SSDS Certified Survey Worksheet for all survey information as recorded in the field.

I, Craig Davis, having personal knowledge of all the facts, hereby certify that the above listed Directional Survey is true and correct as determined from all available Sperry-Sun Drilling Services records.

Craig Davis

Directional Drilling Coordinator

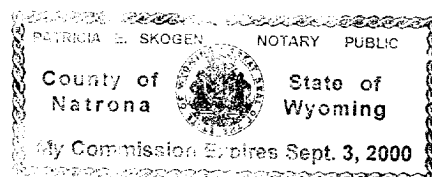
On this 17th day of November, 1999, before me personally appeared Craig Davis to me known as the person described in and who executed the same as his/her free act and deed.

Patricia E. Skogen

Notary Public in and for the County of
Natrona, State of Wyoming

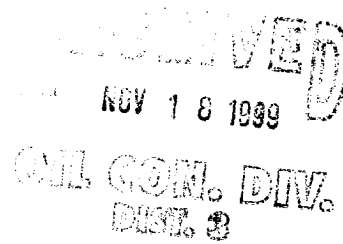
SEPT. 3, 2000

My Commission Expires



November 17, 1999

**NEW MEXICO OIL CONSERVATION
Oil & Gas Division
1000 Rio Brazos Road
Aztec, New Mexico
87410**



For the attention of : Frank Chavez

Dear Sir,

Please find enclosed one (1) original of our certified survey results on the well described below.

Customer : Williams Production Company
Well : Rosa Unit #167
Rig : Aztec #124
Field : Mesa Verde
Legal : Sec. 8 - ^{31 6}T37N - R86W
County : Rio Arriba
State : New Mexico

Please feel free to call upon me at any time should you have any questions regarding the enclosed information.

Sincerely,

**Craig Davis
Directional Drilling Coordinator
7197 W. Derrick Drive
Casper, Wyoming 82604
(307) 472-5757**

SPERRY-SUN DRILLING SERVICES

CERTIFIED SURVEY WORK SHEET

OPERATOR:	Williams Production Co.
WELL:	Rosa #167
FIELD:	Mesa Verde
RIG:	Aztec Well Service #124
LEGALS:	Sec. 8 - T37N - R86W
COUNTY:	San Juan
STATE:	New Mexico
CAL. METHOD:	Minimum Curvature
MAG. DECL. APPLIED:	11.3° East
VERTICAL SEC. DIR. :	104.95

SSDS Job Number :	CA-MJ-90116
Start Date of Job :	10/20/99
End Date of Job :	10/29/99
Lead Directional Driller:	J. Groom
Other SSDS DD's :	R.E. Merlin
SSDS MWD Engineers :	R. Blajszczak

	Main Hole		1st Side Track		2nd Side Track		3rd Side Track		4th Side Track	
	0.00	Tie On	Tie On		Tie On		Tie On		Tie On	
Well Head										
Surface Csg. Shoe	288.00	NA								
First Survey Depth	325.09	MWD								
Last Survey Depth	4231.34	MWD								
KOP Depth/Sidetrack MD	624.00	KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
First Survey Depth	4290.53	SS								
Last Survey Depth	6641.00	SS								
Bit Extrapolation to TD	6683.00	T.D.								

The following Sperry Sun Drilling Services personnel listed below, do certify the above survey information to be accurate :

Print Name :	Justin Lee Groom	Print Name :	
Sign Name :	Justin Lee Groom	Sign Name :	
Print Name :		Print Name :	
Sign Name :		Sign Name :	

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

Williams Production Company

**Mesa Verde Field
San Juan Co., NM
Sec. 8 - T31N - R6W
Rosa #167 - MWD/SS Survey
Job No. CA-MJ-90116,**

RECEIVED
NOV 18 1999
OIL CON. DIV.
DIST. 3

SURVEY REPORT

1 November, 1999

Your Ref: 90116

sperry-sun
DRILLING SERVICES
A HALLIBURTON COMPANY

Survey Ref: svy1510

Sperry-Sun Drilling Services



Survey Report for Rosa #167 - MWD/SS Survey

Your Ref: 90116

Job No. CA-MJ-90116,

Williams Production Company
Mesa Verde Field

San Juan Co., NM
Sec. 8 - T31N - R6W

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	
325.09	0.800	148.700	325.08	1.94 S	1.18 E	1.64	0.246
387.10	1.000	147.100	387.08	2.76 S	1.70 E	2.35	0.325
449.14	0.900	136.900	449.11	3.57 S	2.32 E	3.17	0.316
511.15	1.200	105.300	511.11	4.10 S	3.28 E	4.23	1.033
542.11	1.800	86.100	542.06	4.15 S	4.08 E	5.02	2.502
572.81	1.600	99.300	572.75	4.19 S	4.99 E	5.90	1.428
603.52	1.800	86.500	603.45	4.23 S	5.89 E	6.78	1.393
634.52	2.400	86.300	634.42	4.16 S	7.02 E	7.86	1.836
665.53	3.100	96.500	665.40	4.21 S	8.51 E	9.30	2.746
696.52	4.300	96.700	696.32	4.44 S	10.49 E	11.28	3.872
728.12	5.200	98.900	727.82	4.80 S	13.08 E	13.88	2.905
758.67	5.900	101.600	758.22	5.33 S	15.99 E	16.82	2.445
789.82	6.600	105.300	789.19	6.13 S	19.28 E	20.21	2.592
820.79	7.100	105.300	819.94	7.10 S	22.85 E	23.90	1.614
852.42	8.100	106.800	851.29	8.26 S	26.87 E	28.09	3.223
884.03	8.500	106.300	882.57	9.56 S	31.24 E	32.65	1.286
914.59	9.200	105.100	912.76	10.83 S	35.77 E	37.35	2.369
944.13	9.600	105.400	941.91	12.10 S	40.42 E	42.17	1.364
974.33	10.000	104.600	971.66	13.43 S	45.39 E	47.31	1.399
1005.80	10.800	103.700	1002.62	14.82 S	50.89 E	52.99	2.594
1036.95	11.800	103.000	1033.16	16.22 S	56.83 E	59.10	3.240
1067.77	12.500	103.900	1063.29	17.73 S	63.14 E	65.58	2.353
1098.78	12.800	105.300	1093.55	19.45 S	69.71 E	72.37	1.383
1130.28	13.400	105.600	1124.23	21.35 S	76.59 E	79.51	1.917
1161.11	14.000	104.900	1154.18	23.27 S	83.64 E	86.81	2.019
1192.44	14.100	104.600	1184.58	25.20 S	90.99 E	94.42	0.395
1223.77	14.700	104.400	1214.92	27.15 S	98.54 E	102.21	1.922
1254.73	15.600	104.200	1244.80	29.15 S	106.38 E	110.30	2.912
1285.11	16.400	105.600	1274.01	31.31 S	114.47 E	118.67	2.923
1317.02	17.200	104.900	1304.56	33.73 S	123.37 E	127.89	2.586
1348.87	17.400	103.300	1334.96	36.04 S	132.55 E	137.36	1.620
1380.24	18.000	102.100	1364.85	38.13 S	141.86 E	146.89	2.238
1410.04	18.900	103.000	1393.12	40.19 S	151.06 E	156.32	3.168
1440.00	19.800	104.200	1421.39	42.52 S	160.71 E	166.24	3.284
1471.26	20.600	104.900	1450.72	45.23 S	171.16 E	177.03	2.673
1502.14	21.100	105.400	1479.58	48.11 S	181.77 E	188.02	1.719
1532.80	21.700	104.700	1508.13	51.01 S	192.57 E	199.21	2.127
1562.23	23.100	103.500	1535.34	53.74 S	203.45 E	210.42	5.004
1593.60	23.800	102.600	1564.11	56.56 S	215.61 E	222.90	2.506

Continued...

Sperry-Sun Drilling Services



Survey Report for Rosa #167 - MWD/SS Survey

Your Ref: 90116

Job No. CA-MJ-90116,

Williams Production Company
Mesa Verde Field

San Juan Co., NM
Sec. 8 - T31N - R6W

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
1625.20	24.500	102.800	1592.95	59.40 S	228.22 E	235.82	2.230
1656.56	25.300	102.800	1621.39	62.33 S	241.09 E	249.01	2.551
1688.16	26.300	102.600	1649.84	65.35 S	254.51 E	262.75	3.177
1718.44	26.800	103.300	1676.93	68.38 S	267.70 E	276.28	1.948
1748.96	27.200	103.700	1704.12	71.62 S	281.17 E	290.13	1.439
1778.78	27.900	103.700	1730.56	74.88 S	294.57 E	303.92	2.347
1809.31	29.000	104.200	1757.40	78.39 S	308.69 E	318.46	3.686
1839.96	30.000	105.100	1784.08	82.21 S	323.29 E	333.55	3.569
1870.57	30.800	104.900	1810.48	86.22 S	338.25 E	349.04	2.634
1899.54	31.900	104.600	1835.22	90.06 S	352.83 E	364.12	3.836
1931.25	33.300	103.700	1861.94	94.23 S	369.39 E	381.20	4.672
1994.65	34.500	102.500	1914.56	102.24 S	403.83 E	416.54	2.167
2056.71	34.100	101.900	1965.83	109.63 S	438.01 E	451.47	0.844
2119.30	34.400	103.000	2017.56	117.22 S	472.41 E	486.66	1.099
2182.46	34.500	103.500	2069.65	125.41 S	507.19 E	522.37	0.475
2244.66	34.600	106.700	2120.88	134.60 S	541.23 E	557.64	2.922
2306.99	34.800	103.500	2172.13	143.84 S	575.48 E	593.11	2.940
2368.92	34.100	103.000	2223.20	151.87 S	609.58 E	628.13	1.219
2431.48	34.200	103.900	2274.97	160.04 S	643.74 E	663.23	0.823
2526.24	34.300	103.200	2353.30	172.53 S	695.58 E	716.55	0.429
2619.65	34.600	102.500	2430.33	184.28 S	747.10 E	769.35	0.532
2711.78	34.500	101.600	2506.21	195.19 S	798.20 E	821.53	0.565
2802.95	34.300	102.900	2581.43	206.12 S	848.53 E	872.98	0.835
2895.00	33.700	102.600	2657.75	217.48 S	898.73 E	924.42	0.677
2988.87	34.800	105.500	2735.34	230.32 S	949.97 E	977.23	2.096
3081.10	34.000	104.300	2811.44	243.72 S	1000.32 E	1029.33	1.137
3142.82	34.300	104.300	2862.52	252.28 S	1033.89 E	1063.98	0.486
3205.00	33.900	104.700	2914.01	261.01 S	1067.64 E	1098.84	0.737
3267.72	32.800	104.200	2966.40	269.61 S	1101.03 E	1133.31	1.808
3329.21	33.600	105.400	3017.85	278.22 S	1133.58 E	1166.98	1.684
3423.47	33.100	104.700	3096.59	291.68 S	1183.62 E	1218.80	0.669
3454.66	32.900	104.500	3122.75	295.96 S	1200.06 E	1235.79	0.730
3486.45	34.100	104.100	3149.26	300.29 S	1217.06 E	1253.33	3.838
3517.87	34.500	103.900	3175.21	304.57 S	1234.24 E	1271.04	1.323
3549.20	34.500	103.200	3201.03	308.73 S	1251.49 E	1288.78	1.266
3609.61	35.500	102.800	3250.52	316.52 S	1285.25 E	1323.40	1.698
3672.97	34.900	101.600	3302.29	324.25 S	1320.95 E	1359.88	1.445
3735.12	35.600	102.400	3353.05	331.70 S	1356.03 E	1395.70	1.349
3797.67	36.000	104.100	3403.78	340.09 S	1391.64 E	1432.27	1.714
3858.41	34.900	104.200	3453.26	348.70 S	1425.80 E	1467.50	1.814

Continued...

Sperry-Sun Drilling Services

Survey Report for Rosa #167 - MWD/SS Survey

Your Ref: 90116

Job No. CA-MJ-90116,



Williams Production Company
Mesa Verde Field

San Juan Co., NM
Sec. 8 - T31N - R6W

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
3920.99	34.900	103.400	3504.59	357.24 S	1460.57 E	1503.30	0.731
3982.44	33.900	102.900	3555.29	365.14 S	1494.38 E	1538.00	1.691
4075.70	33.100	104.600	3633.06	377.37 S	1544.38 E	1589.45	1.322
4138.94	33.000	104.900	3686.06	386.15 S	1577.73 E	1623.94	0.303
4170.82	34.000	105.300	3712.65	390.74 S	1594.72 E	1641.54	3.212
4201.12	33.200	105.300	3737.89	395.16 S	1610.89 E	1658.30	2.640
4231.34	32.300	105.100	3763.30	399.45 S	1626.67 E	1674.65	3.000
4290.53	33.000	108.300	3813.14	408.63 S	1657.24 E	1706.56	3.147
4397.78	31.750	108.300	3903.72	426.66 S	1711.76 E	1763.89	1.166
4649.36	29.750	116.300	4120.01	475.13 S	1830.63 E	1891.23	1.808
4898.50	25.000	131.300	4341.45	537.37 S	1925.76 E	1999.20	3.348
5151.44	16.500	141.300	4577.84	600.81 S	1988.51 E	2076.19	3.629
5405.34	8.500	143.300	4825.52	644.07 S	2022.32 E	2120.02	3.155
5657.05	5.000	152.300	5075.45	668.70 S	2038.54 E	2142.05	1.448
5909.93	4.000	152.300	5327.55	686.27 S	2047.76 E	2155.49	0.395
6124.22	3.500	159.300	5541.38	699.01 S	2053.55 E	2164.37	0.316
6419.44	2.250	186.300	5836.24	713.20 S	2056.10 E	2170.49	0.613
6641.00	1.000	226.300	6057.71	718.86 S	2054.23 E	2170.14	0.730
6683.00	1.000	226.300	6099.71	719.36 S	2053.70 E	2169.76	0.000

All data is in feet 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 100ft.

Vertical Section is from Well and calculated along an Azimuth of 104.950° (True).

Based upon Minimum Curvature type calculations, at a Measured Depth of 6683.00ft.,
The Bottom Hole Displacement is 2176.04ft., in the Direction of 109.304° (True).

11.3° East declination applied to everyl survey azimuth
Station @ 6683' is a projection to the bit at final T.D.

Continued...

Sperry-Sun Drilling Services

Survey Report for Rosa #167 - MWD/SS Survey

Your Ref: 90116

Job No. CA-MJ-90116,



Williams Production Company
Mesa Verde Field

San Juan Co., NM
Sec. 8 - T31N - R6W

Casing details

From		To		Casing Detail
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	
<Surface>	<Surface>	288.00	287.99	9 5/8" Surface Casing
<Surface>	<Surface>	4283.00	3806.82	7" Intermediate Casing
4283.00	3806.82	6683.00	6099.71	4 1/2" Production Liner

Survey tool program

From		To		Survey Tool Description
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	
0.00	0.00	318.00	317.99	TOTCO
318.00	317.99	4283.00	3806.82	MWD Magnetic - SSDS Magnetic MWD
4283.00	3806.82	6683.00	6099.71	Good Magnetic - SSDS Magnetic Single Shot