



Weatherford[®]

Drilling Services

31-039-29920

Final Surveys @ TD



*Surface 2240/S 1820/E
BHL 576/S 2536/W
P.A.*

RCVD SEP 26 '07
OIL CONS. DIV.

WILLIAMS PRODUCTION COMPANY

DIST. 3

ROSA UNIT 169B

Prepared by: Jose A Perez

Submitted: 08/07/07

Weatherford Drilling Services

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File 'As Drd' plat



Weatherford Drilling Services

Survey Report

Company: WILLIAMS PRODUCTION Field: RIO ARRIBA COUNTY Site: ROSA UNIT Well: #169B Wellpath: 1	Date: 8/7/2007 Co-ordinate(NE) Reference: Site: ROSA UNIT, True North Vertical (TVD) Reference: SITE 0.0 Section (VS) Reference: Well (0.00N,0.00E,207.77Azi) Survey Calculation Method: Minimum Curvature Db: Sybase
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Field: RIO ARRIBA COUNTY
NEW MEXICO

Map System: US State Plane Coordinate System 1983
Geo Datum: GRS 1980
Sys Datum: Mean Sea Level

Map Zone: New Mexico, Central Zone
Coordinate System: Site Centre
Geomagnetic Model: igrf2005

Site: ROSA UNIT

RIO ARRIBA, NEW MEXICO

Site Position:	Northing: 2159104.15 ft	Latitude: 36 55 39.000 N
From: Geographic	Easting: 1290406.48 ft	Longitude: 107 26 51.000 W
Position Uncertainty: 0.00 ft		North Reference: True
Ground Level: 0.00 ft		Grid Convergence: -0.72 deg

Well: #169B

Slot Name:

Well Position: +N/-S 0.00 ft	Northing: 2159104.15 ft	Latitude: 36 55 39.000 N
+E/-W 0.00 ft	Easting: 1290406.48 ft	Longitude: 107 26 51.000 W
Position Uncertainty: 0.00 ft		

Wellpath: 1

Current Datum: SITE	Height 0.00 ft	Drilled From: Surface
Magnetic Data: 6/4/2007		Tie-on Depth: 0.00 ft
Field Strength: 51356 nT		Above System Datum: Mean Sea Level
Vertical Section: Depth From (TVD)		Declination: 10.27 deg
ft	+N/-S ft	Mag Dip Angle: 63.79 deg
		+E/-W ft
		Direction deg
0.00	0.00	0 00 207.77

Survey: MWD Surveys

Start Date: 6/11/2007

Company: Weatherford Drilling Services
Tool:

Engineer:
Tied-to: From Surface

Survey: MWD Surveys

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
339.00	0.00	0.00	339.00	0.00	0.00	0.00	0.00	0.00	0.00	Surface Casing Tie On
417.00	1.38	210.15	416.99	-0.81	-0.47	0.94	1.77	1.77	0.00	First MWD Survey
447.00	1.88	210.02	446.98	-1.55	-0.90	1.79	1.67	1.67	-0.43	
476.00	2.50	212.27	475.96	-2.50	-1.48	2.90	2.16	2.14	7.76	
507.00	3.13	212.40	506.92	-3.78	-2.29	4.41	2.03	2.03	0.42	
538.00	3.88	213.02	537.86	-5.38	-3.31	6.30	2.42	2.42	2.00	
568.00	4.63	211.15	567.78	-7.26	-4.49	8.52	2.54	2.50	-6.23	
599.00	5.63	211.15	598.66	-9.64	-5.93	11.29	3.23	3.23	0.00	
628.00	6.88	211.77	627.48	-12.33	-7.58	14.44	4.32	4.31	2.14	
659.00	8.06	212.77	658.22	-15.74	-9.73	18.46	3.83	3.81	3.23	
690.00	9.31	213.02	688.86	-19.67	-12.28	23.12	4.03	4.03	0.81	
721.00	10.56	211.40	719.40	-24.19	-15.12	28.45	4.13	4.03	-5.23	
751.00	11.63	209.65	748.84	-29.17	-18.05	34.22	3.74	3.57	-5.83	
782.00	12.81	208.27	779.13	-34.91	-21.22	40.78	3.92	3.81	-4.45	
812.00	14.00	205.77	808.32	-41.11	-24.38	47.73	4.41	3.97	-8.33	
842.00	15.31	204.65	837.34	-47.98	-27.61	55.31	4.47	4.37	-3.73	
873.00	16.81	206.15	867.13	-55.72	-31.29	63.88	5.02	4.84	4.84	
905.00	18.19	204.90	897.65	-64.41	-35.43	73.50	4.47	4.31	-3.91	
936.00	19.63	205.15	926.97	-73.51	-39.68	83.53	4.65	4.65	0.81	
967.00	20.88	205.02	956.06	-83.23	-44.23	94.25	4.03	4.03	-0.42	
999.00	22.44	205.40	985.80	-93.91	-49.26	106.05	4.89	4.87	1.19	
1031.00	23.81	207.15	1015.22	-105.18	-54.83	118.61	4.79	4.28	5.47	
1063.00	24.94	206.90	1044.37	-116.94	-60.83	131.82	3.55	3.53	-0.78	



Weatherford Drilling Services

Survey Report

Company: WILLIAMS PRODUCTION	Date: 8/7/2007	Time: 13:57:00	Page: 2
Field: RIO ARRIBA COUNTY	Co-ordinate(NE) Reference:	Site: ROSA UNIT, True North	
Site: ROSA UNIT	Vertical (TVD) Reference:	SITE 0.0	
Well: #169B	Section (VS) Reference:	Well (0.00N,0.00E,207.77Azi)	
Wellpath: 1	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Survey: MWD Surveys

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
1095.00	26.19	207.02	1073.24	-129.25	-67.09	145.62	3.91	3.91	0.37	
1126.00	27.19	207.52	1100.93	-141.63	-73.47	159.55	3.31	3.23	1.61	
1158.00	28.63	207.02	1129.21	-154.94	-80.33	174.53	4.56	4.50	-1.56	
1190.00	29.75	207.90	1157.15	-168.79	-87.53	190.13	3.75	3.50	2.75	
1222.00	30.81	207.40	1184.78	-183.08	-95.02	206.27	3.40	3.31	-1.56	
1253.00	31.81	207.02	1211.27	-197.41	-102.38	222.37	3.29	3.23	-1.23	
1285.00	32.56	207.40	1238.35	-212.57	-110.18	239.42	2.43	2.34	1.19	
1317.00	33.06	207.04	1265.24	-227.99	-118.11	256.76	1.68	1.56	-1.12	
1347.00	33.75	206.90	1290.29	-242.71	-125.60	273.27	2.31	2.30	-0.47	
1379.00	34.38	207.02	1316.80	-258.68	-133.73	291.19	1.98	1.97	0.37	
1411.00	34.94	207.02	1343.12	-274.89	-141.99	309.39	1.75	1.75	0.00	
1442.00	35.44	207.52	1368.45	-290.77	-150.18	327.26	1.86	1.61	1.61	
1474.00	36.56	207.40	1394.34	-307.46	-158.85	346.06	3.51	3.50	-0.37	
1506.00	37.44	206.77	1419.90	-324.61	-167.62	365.32	2.99	2.75	-1.97	
1538.00	38.00	206.52	1445.21	-342.11	-176.40	384.89	1.81	1.75	-0.78	
1569.00	38.13	206.27	1469.62	-359.23	-184.90	404.00	0.65	0.42	-0.81	
1633.00	38.94	205.65	1519.68	-395.08	-202.35	443.85	1.40	1.27	-0.97	
1695.00	39.75	205.02	1567.62	-430.60	-219.17	483.12	1.46	1.31	-1.02	
1759.00	40.00	205.02	1616.74	-467.78	-236.52	524.11	0.39	0.39	0.00	
1822.00	40.00	205.02	1665.00	-504.48	-253.65	564.56	0.00	0.00	0.00	
1884.00	40.00	205.52	1712.50	-540.52	-270.66	604.37	0.52	0.00	0.81	
1948.00	39.69	205.90	1761.63	-577.47	-288.45	645.35	0.62	-0.48	0.59	
2011.00	40.13	206.65	1809.96	-613.71	-306.34	685.75	1.03	0.70	1.19	
2075.00	40.06	207.40	1858.92	-650.43	-325.07	726.97	0.76	-0.11	1.17	
2139.00	39.19	208.02	1908.21	-686.56	-344.05	767.79	1.49	-1.36	0.97	
2202.00	40.38	208.27	1956.62	-722.11	-363.06	808.10	1.91	1.89	0.40	
2265.00	40.19	208.40	2004.68	-757.96	-382.40	848.83	0.33	-0.30	0.21	
2327.00	40.13	208.77	2052.07	-793.07	-401.53	888.81	0.40	-0.10	0.60	
2391.00	39.56	209.77	2101.20	-828.84	-421.58	929.80	1.34	-0.89	1.56	
2454.00	39.19	207.90	2149.91	-863.85	-440.85	969.76	1.97	-0.59	-2.97	
2516.00	38.56	208.02	2198.17	-898.22	-459.10	1008.67	1.02	-1.02	0.19	
2577.00	37.81	209.02	2246.12	-931.36	-477.10	1046.38	1.59	-1.23	1.64	
2640.00	37.31	209.40	2296.06	-964.88	-495.84	1084.77	0.87	-0.79	0.60	
2704.00	37.19	209.90	2347.01	-998.54	-515.00	1123.49	0.51	-0.19	0.78	
2766.00	38.25	211.15	2396.05	-1031.21	-534.27	1161.37	2.11	1.71	2.02	
2830.00	39.50	211.02	2445.87	-1065.61	-555.01	1201.47	1.96	1.95	-0.20	
2891.00	38.94	209.90	2493.13	-1098.86	-574.56	1240.00	1.48	-0.92	-1.84	
2953.00	38.75	209.40	2541.42	-1132.65	-593.80	1278.86	0.59	-0.31	-0.81	
3016.00	38.94	209.15	2590.49	-1167.12	-613.12	1318.37	0.39	0.30	-0.40	
3040.00	39.50	209.27	2609.08	-1180.37	-620.53	1333.54	2.35	2.33	0.50	
3072.00	39.44	209.27	2633.78	-1198.11	-630.48	1353.87	0.19	-0.19	0.00	
3104.00	39.00	209.40	2658.57	-1215.75	-640.39	1374.10	1.40	-1.37	0.41	
3135.00	38.13	208.77	2682.81	-1232.64	-649.78	1393.42	3.08	-2.81	-2.03	
3167.00	37.00	208.77	2708.18	-1249.74	-659.17	1412.92	3.53	-3.53	0.00	
3199.00	35.88	208.65	2733.92	-1266.41	-668.30	1431.93	3.51	-3.50	-0.37	
3230.00	34.50	208.65	2759.26	-1282.08	-676.87	1449.79	4.45	-4.45	0.00	
3261.00	33.63	208.52	2784.94	-1297.33	-685.18	1467.15	2.82	-2.81	-0.42	
3293.00	32.81	208.15	2811.71	-1312.76	-693.50	1484.68	2.64	-2.56	-1.16	
3325.00	31.56	207.77	2838.79	-1327.82	-701.49	1501.73	3.96	-3.91	-1.19	
3357.00	30.56	207.65	2866.20	-1342.43	-709.17	1518.24	3.13	-3.12	-0.37	
3387.90	29.13	207.15	2893.00	-1356.08	-716.25	1533.61	4.70	-4.63	-1.62	
3388.00	29.13	207.15	2893.09	-1356.13	-716.27	1533.66	0.00	0.00	0.00	
3420.00	28.13	207.40	2921.17	-1369.76	-723.29	1548.99	3.15	-3.12	0.78	



Weatherford Drilling Services

Survey Report

Company: WILLIAMS PRODUCTION	Date: 8/7/2007	Time: 13:57:00	Page: 3
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Site: ROSA UNIT	Vertical (TVD) Reference:	SITE 0.0	
Well: #169B	Section (VS) Reference:	Well (0.00N,0.00E,207.77Azi)	
Wellpath: 1	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Survey: MWD Surveys

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
3452.00	27.06	208.02	2949.53	-1382.88	-730.18	1563.82	3.46	-3.34	1.94	
3484.00	26.06	207.77	2978.16	-1395.52	-736.88	1578.12	3.14	-3.12	-0.78	
3515.00	24.56	207.27	3006.18	-1407.28	-743.00	1591.38	4.89	-4.84	-1.61	
3547.00	23.19	207.27	3035.44	-1418.79	-748.94	1604.33	4.28	-4.28	0.00	
3578.00	21.94	207.15	3064.07	-1429.37	-754.38	1616.22	4.03	-4.03	-0.39	
3610.00	21.38	207.15	3093.81	-1439.88	-759.77	1628.03	1.75	-1.75	0.00	
3642.00	20.88	207.52	3123.66	-1450.12	-765.06	1639.57	1.62	-1.56	1.16	
3646.65	20.87	207.54	3128.00	-1451.59	-765.83	1641.22	0.26	-0.22	0.43	
3674.00	20.81	207.65	3153.56	-1460.22	-770.34	1650.95	0.26	-0.22	0.40	
3705.00	20.88	207.40	3182.53	-1470.00	-775.43	1661.99	0.37	0.23	-0.81	
3737.00	20.63	207.40	3212.46	-1480.07	-780.65	1673.33	0.78	-0.78	0.00	
3769.00	19.81	207.27	3242.48	-1489.89	-785.73	1684.38	2.57	-2.56	-0.41	
3800.00	19.19	207.27	3271.71	-1499.09	-790.47	1694.73	2.00	-2.00	0.00	
3832.00	18.63	207.02	3301.98	-1508.32	-795.20	1705.10	1.77	-1.75	-0.78	
3864.00	17.50	206.77	3332.40	-1517.17	-799.69	1715.02	3.54	-3.53	-0.78	
3896.00	16.44	207.27	3363.01	-1525.49	-803.94	1724.36	3.34	-3.31	1.56	
3926.00	15.88	207.15	3391.82	-1532.91	-807.75	1732.71	1.87	-1.87	-0.40	
3958.00	14.81	206.02	3422.68	-1540.48	-811.55	1741.18	3.47	-3.34	-3.53	
3989.30	13.96	206.26	3453.00	-1547.47	-814.97	1748.95	2.72	-2.72	0.77	
3990.00	13.94	206.27	3453.68	-1547.62	-815.05	1749.12	2.88	-2.86	1.43	
4022.00	12.63	208.77	3484.82	-1554.14	-818.44	1756.47	4.47	-4.09	7.81	
4052.00	10.75	211.02	3514.20	-1559.41	-821.46	1762.54	6.45	-6.27	7.50	
4082.00	9.25	210.27	3543.74	-1563.89	-824.11	1767.75	5.02	-5.00	-2.50	
4113.00	7.63	210.40	3574.40	-1567.82	-826.41	1772.29	5.23	-5.23	0.42	
4145.00	6.63	207.15	3606.16	-1571.30	-828.33	1776.26	3.37	-3.12	-10.16	
4177.00	5.38	201.90	3637.98	-1574.33	-829.73	1779.60	4.26	-3.91	-16.41	
4209.00	4.06	200.90	3669.87	-1576.78	-830.70	1782.22	4.13	-4.12	-3.12	
4240.00	2.88	204.27	3700.81	-1578.52	-831.41	1784.09	3.86	-3.81	10.87	Last MWD Survey
6587.00	1.75	207.00	6045.86	-1664.20	-871.91	1878.77	0.05	-0.05	0.12	Total Depth

Annotation

MD ft	TVD ft	
339.00	339.00	Surface Casing Tie On
417.00	416.99	First MWD Survey
4240.00	3700.81	Last MWD Survey
6587.00	6045.86	Total Depth