ENERGEN RESOURCES

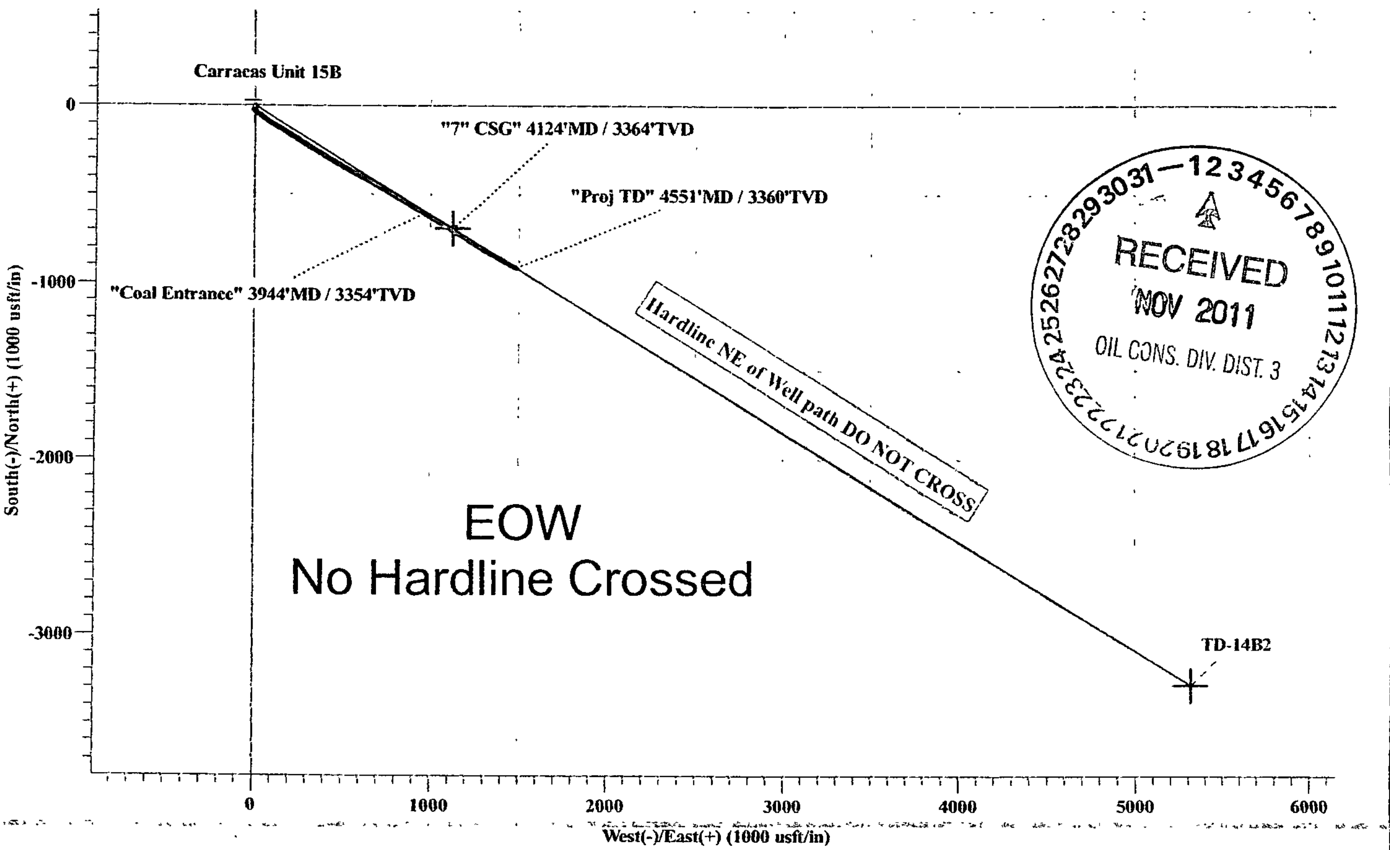
PATHFINDER
A Schlumberger Company

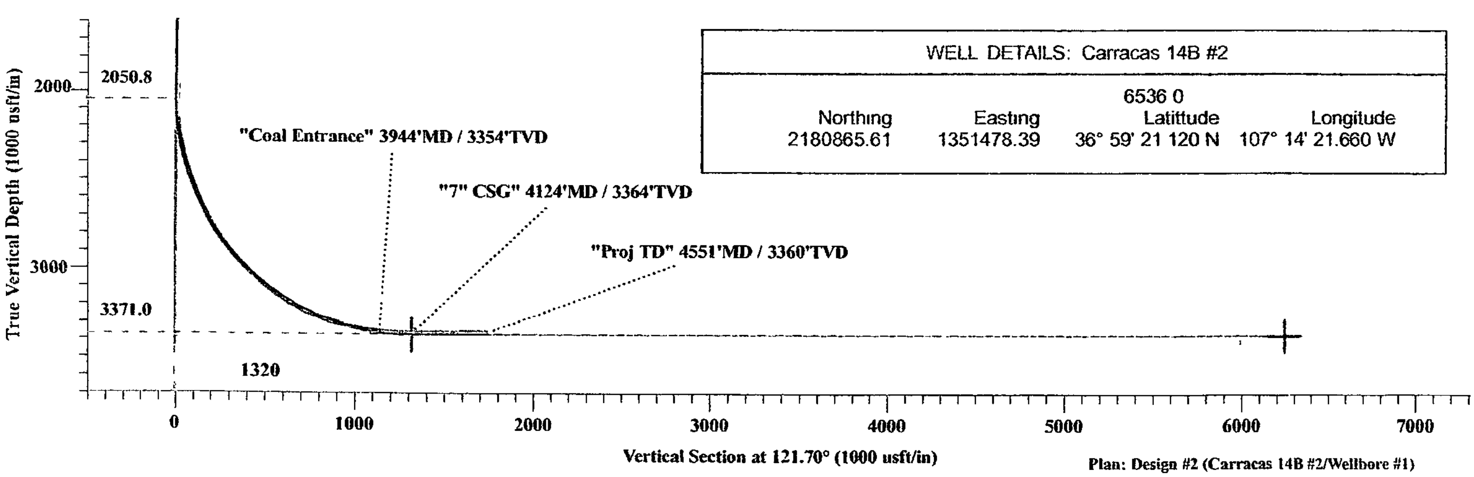
Carracas 14B #2
Sec14 T32N-R4W - 14B
Rio Arriba Co NM
GE: 6536' / KB: 14'

30·039·30962

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
LAND-14B2	3371.0	-693.7	1123.2	2180160 27	1352594.32	Point
TD-14B2	3371.0	-3283.6	5316.3	2177526.92	1356760.33	Point





WELL DETAILS: Carracas 14B #2

		6536 0	
Northing	Easting	Latitude	Longitude
2180865.61	1351478.39	36° 59' 21 120 N	107° 14' 21.660 W

Plan: Design #2 (Carracas 14B #2/Wellbore #1)

Created By: Frank C. Scardino Date: 8/17/2011

Energen Resources

Rio Arriba County
Sec14 T32N-R4W - 14B
Carracas 14B #2

Wellbore #1

Design: Wellbore #1

Standard Survey Report

08 September, 2011

Company:	Energen Resources	**Local Co-ordinate Reference:**	Well Carracas 14B #2
Project:	Rio Arriba County	**TVD Reference:**	WELL @ 6550.0usft (Original Well Elev)
Site:	Sec14 T32N-R4W - 14B	**MD Reference:**	WELL @ 6550.0usft (Original Well Elev)
Well:	Carracas 14B #2	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000 1 Single User Db

Project	Rio Arriba County		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	Sec14 T32N-R4W - 14B				
Site Position:		**Northing:**	2,180,865.61 usft	**Latitude:**	36° 59' 21.120 N
From:	Lat/Long	**Easting:**	1,351,478 39 usft	**Longitude:**	107° 14' 21 660 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-0 60 °

Well	Carracas 14B #2					
Well Position	**+N/-S**	0 0 usft	**Northing:**	2,180,865 61 usft	**Latitude:**	36° 59' 21 120 N
	+E/-W	0 0 usft	**Easting:**	1,351,478 39 usft	**Longitude:**	107° 14' 21 660 W
Position Uncertainty		0 0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	6,536 0 usft

Wellbore	Wellbore #1				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	08/11/11	9.68	63 77	50,931

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0 0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0 0	0.0	0 0	121 70	

Survey Program **Date** 09/08/11

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
329.0	4,551.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0 0	0 00	0 00	0 0	0.0	0.0	0 0	0 00	0 00	0.00
329 0	0 79	187.50	329 0	-2 2	-0 3	0 9	0 24	0 24	0 00
424.0	0 97	190 93	424 0	-3 7	-0.5	1 5	0 20	0 19	3 61
520 0	1 14	194 94	520.0	-5.4	-0 9	2.0	0.19	0 18	4.18
616.0	0 62	175 32	616 0	-6.8	-1 1	2 6	0 62	-0 54	-20 44
711 0	0 70	172 12	710 9	-7 9	-1.0	3 3	0.09	0 08	-3 37
807 0	0 70	177 01	806.9	-9 1	-0 9	4 0	0 06	0 00	5 09
902.0	0.62	188 55	901 9	-10 2	-1 0	4 5	0 16	-0 08	12.15
998 0	0.79	188 90	997 9	-11 4	-1.1	5 0	0 18	0 18	0 36
1,093 0	0.70	194 21	1,092.9	-12.6	-1 4	5.4	0 12	-0.09	5 59

Survey Report

Company:	Energen Resources	**Local Co-ordinate Reference:**	Well Carracas 14B #2
Project:	Rio Arriba County	**TVD Reference:**	WELL @ 6550.0usft (Original Well Elev)
Site:	Sec14 T32N-R4W - 14B	**MD Reference:**	WELL @ 6550.0usft (Original Well Elev)
Well:	Carracas 14B #2	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,189.0	0.62	202.64	1,188.9	-13.6	-1.7	5.7	0.13	-0.08	8.78
1,284.0	0.79	199.58	1,283.9	-14.7	-2.1	5.9	0.18	0.18	-3.22
1,380.0	0.88	218.65	1,379.9	-15.9	-2.8	6.0	0.30	0.09	19.86
1,475.0	0.97	213.03	1,474.9	-17.1	-3.7	5.9	0.13	0.09	-5.92
1,568.0	0.79	213.65	1,567.9	-18.3	-4.5	5.8	0.19	-0.19	0.67
1,658.0	0.79	210.66	1,657.9	-19.4	-5.2	5.8	0.05	0.00	-3.32
1,751.0	0.88	216.70	1,750.9	-20.5	-5.9	5.8	0.14	0.10	6.49
1,846.0	0.88	210.99	1,845.8	-21.7	-6.7	5.7	0.09	0.00	-6.01
1,938.0	0.79	216.63	1,937.8	-22.8	-7.5	5.7	0.13	-0.10	6.13
2,031.0	0.62	213.84	2,030.8	-23.8	-8.1	5.6	0.19	-0.18	-3.00
2,062.0	0.62	173.90	2,061.8	-24.1	-8.2	5.7	1.37	0.00	-128.84
2,092.0	1.41	152.09	2,091.8	-24.6	-8.0	6.1	2.89	2.63	-72.70
2,122.0	2.55	140.45	2,121.8	-25.4	-7.4	7.0	4.01	3.80	-38.80
2,151.0	4.13	136.49	2,150.7	-26.7	-6.3	8.7	5.50	5.45	-13.66
2,180.0	5.80	133.30	2,179.6	-28.4	-4.5	11.1	5.83	5.76	-11.00
2,211.0	7.47	132.23	2,210.4	-30.9	-1.9	14.6	5.40	5.39	-3.45
2,242.0	8.62	128.84	2,241.1	-33.7	1.4	18.9	4.01	3.71	-10.94
2,271.0	9.67	127.79	2,269.8	-36.5	5.1	23.5	3.67	3.62	-3.62
2,302.0	10.82	127.35	2,300.3	-39.9	9.4	29.0	3.72	3.71	-1.42
2,333.0	12.22	126.53	2,330.6	-43.6	14.4	35.1	4.55	4.52	-2.65
2,364.0	13.63	126.08	2,360.8	-47.7	20.0	42.1	4.56	4.55	-1.45
2,394.0	15.21	125.91	2,389.9	-52.1	26.0	49.5	5.27	5.27	-0.57
2,423.0	16.71	125.97	2,417.8	-56.8	32.5	57.5	5.17	5.17	0.21
2,455.0	18.29	124.98	2,448.3	-62.4	40.3	67.1	5.02	4.94	-3.09
2,485.0	19.79	124.54	2,476.7	-67.9	48.3	76.8	5.02	5.00	-1.47
2,516.0	20.93	123.80	2,505.7	-74.0	57.3	87.6	3.77	3.68	-2.39
2,546.0	21.98	123.66	2,533.6	-80.1	66.4	98.6	3.50	3.50	-0.47
2,577.0	23.04	123.51	2,562.3	-86.6	76.3	110.4	3.42	3.42	-0.48
2,607.0	24.27	123.80	2,589.8	-93.3	86.3	122.5	4.12	4.10	0.97
2,637.0	25.41	122.59	2,617.0	-100.2	96.8	135.1	4.16	3.80	-4.03
2,666.0	26.20	121.19	2,643.1	-106.9	107.6	147.7	3.44	2.72	-4.83
2,697.0	26.56	118.69	2,670.9	-113.8	119.5	161.4	3.77	1.16	-8.06
2,727.0	27.26	118.21	2,697.6	-120.2	131.4	175.0	2.44	2.33	-1.60
2,757.0	27.96	118.34	2,724.2	-126.8	143.7	188.9	2.34	2.33	0.43
2,787.0	29.46	118.56	2,750.5	-133.7	156.3	203.3	5.01	5.00	0.73
2,818.0	31.22	120.29	2,777.3	-141.4	170.0	218.9	6.34	5.68	5.58
2,850.0	33.15	121.33	2,804.3	-150.1	184.6	236.0	6.27	6.03	3.25
2,882.0	35.00	122.90	2,830.9	-159.6	199.8	253.9	6.40	5.78	4.91
2,914.0	36.49	124.14	2,856.8	-170.0	215.4	272.6	5.18	4.66	3.88
2,946.0	37.72	124.48	2,882.3	-180.8	231.3	291.8	3.90	3.84	1.06
2,978.0	39.04	123.53	2,907.4	-192.0	247.8	311.7	4.52	4.13	-2.97
3,010.0	40.89	123.44	2,932.0	-203.3	264.9	332.2	5.78	5.78	-0.28
3,042.0	42.38	121.40	2,955.9	-214.7	282.9	353.5	6.29	4.66	-6.38
3,073.0	43.88	121.05	2,978.5	-225.7	301.0	374.7	4.90	4.84	-1.13

Survey Report

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Site:	Sec14 T32N-R4W - 14B	**MD Reference:**	WELL @ 6550 0usft (Original Well Elev)
Well:	Carracas 14B #2	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,105 0	45 11	120 40	3,001 3	-237.1	320.3	397 1	4 10	3 84	-2 03
3,137 0	46 25	119.93	3,023 7	-248 6	340 1	420 0	3 71	3 56	-1 47
3,168 0	47 13	120 06	3,044 9	-259 9	359.6	442 5	2 86	2 84	0 42
3,200 0	49 07	119.96	3,066 3	-271.8	380.2	466.3	6 07	6 06	-0.31
3,232.0	51 09	120 25	3,086 8	-284 1	401 5	490 9	6 35	6.31	0 91
3,264.0	52 58	120 29	3,106.6	-296 8	423 2	516 0	4 66	4 66	0 13
3,295 0	52 76	120 89	3,125 4	-309 4	444 4	540 7	1 64	0 58	1 94
3,327 0	52 85	120.95	3,144.8	-322 5	466 3	566 2	0 32	0.28	0 19
3,391.0	57 42	118.79	3,181.3	-348 6	511 8	618.6	7 66	7 14	-3.38
3,455 0	62 08	118.32	3,213 6	-375 0	560 4	673 8	7.31	7.28	-0.73
3,518 0	64.90	118.36	3,241.7	-401 8	610 0	730 1	4 48	4 48	0 06
3,582 0	67 44	119 24	3,267 5	-430 0	661 3	788 6	4 16	3 97	1 38
3,644 0	70.70	119.94	3,289 7	-458 5	711 6	846 4	5 36	5 26	1 13
3,707 0	74.39	120 65	3,308 6	-488.9	763 5	906 5	5 95	5 86	1 13
3,771.0	76.24	121 40	3,324.8	-520 8	816 6	968.4	3 10	2.89	1 17
3,835 0	78 96	121.08	3,338 6	-553 2	870 0	1,030 9	4 28	4 25	-0 50
3,898.0	83.01	121.01	3,348.4	-585 3	923 3	1,093.1	6 43	6 43	-0 11
3,944.0	82 95	121 20	3,354 0	-608 9	962.4	1,138 7	0.44	-0 14	0 42
"Coal Entrance" 3944'MD / 3354'TVD									
3,962 0	82 92	121 28	3,356 3	-618.1	977 7	1,156 6	0 44	-0 14	0.42
4,026 0	86 35	120 50	3,362.2	-650 8	1,032 3	1,220 3	5.49	5 36	-1 22
4,063 0	89.08	120.89	3,363 7	-669 7	1,064.1	1,257.3	7.45	7.38	1 05
4,124 0	89 86	121 34	3,364 3	-701 2	1,116 3	1,318 3	1 48	1 28	0 74
"7" CSG" 4124'MD / 3364'TVD									
4,166 0	90 40	121 65	3,364.2	-723 2	1,152 2	1,360 3	1 48	1 28	0 74
4,229 0	90 22	122 62	3,363 8	-756 7	1,205 5	1,423 3	1 57	-0 29	1 54
4,293 0	90.75	121 74	3,363 3	-790 8	1,259 7	1,487.3	1.61	0 83	-1 38
4,357.0	90 84	120 25	3,362 4	-823 7	1,314.5	1,551 2	2 33	0.14	-2 33
4,420 0	90 66	119 28	3,361 5	-855 0	1,369.2	1,614.2	1 57	-0 29	-1.54
4,484 0	90 57	118 93	3,360.9	-886 1	1,425.1	1,678 1	0 56	-0 14	-0 55
4,551 0	90.57	118 93	3,360 2	-918.5	1,483 8	1,745.0	0 00	0.00	0 00
"Proj TD" 4551'MD / 3360'TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
3,944.0	3,354 0	-608 9	962 4	"Coal Entrance" 3944'MD / 3354'TVD
4,124 0	3,364 3	-701.2	1,116 3	"7" CSG" 4124'MD / 3364'TVD
4,551 0	3,360.2	-918.5	1,483 8	"Proj TD" 4551'MD / 3360'TVD

Checked By: ____________	Approved By: ____________	Date: ____________