

PathFinder Energy Services, Inc.

Survey Report

EOG RESOURCES, INC.
ROSS DRAW 8 FED #2H
BONE SPRING
Rig:
PathFinder Office Supervisor:
PathFinder Field Engineers:

Survey Horiz. Reference: WELLHEAD
Ref Coordinates: LAT: 32.3.49.3073 N LON: 103.47.54.8246 W
GRID Reference: NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 665662.5000 Y: 387307.9000
North Aligned To: GRID NORTH
Total Magnetic Correction: 7.40° EAST TO GRID
Vertical Section Plane: 172.72
Survey Vert. Reference: 0.00' Kelly Bushing To MSL

Survey Calculations by RX5 V6.03E using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Subsea Depth (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)	TEMP (F)
TIE-IN TO SURFACE											
0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00@	0.00	0.00	0.00
THE FOLLOWING ARE SINGLE SHOT GYRO SURVEYS											
183.00	0.70	339.50	183.00	183.00	-1.09	1.05 N	0.39 W	1.12@	339.50	0.38	0.00
371.00	0.50	310.20	370.99	370.99	-2.81	2.65 N	1.42 W	3.01@	331.83	0.19	0.00
567.00	0.10	333.80	566.98	566.98	-3.60	3.36 N	2.15 W	3.99@	327.38	0.21	0.00
741.00	0.20	108.30	740.98	740.98	-3.62	3.40 N	1.93 W	3.91@	330.44	0.16	0.00
922.00	0.40	180.00	921.98	921.98	-2.85	2.67 N	1.63 W	3.12@	328.61	0.21	0.00
1106.00	0.90	152.90	1105.97	1105.97	-0.86	0.74 N	0.97 W	1.22@	307.31	0.31	0.00
1297.00	1.30	159.90	1296.93	1296.93	2.67	2.63 S	0.46 E	2.67@	170.11	0.22	0.00
1382.00	1.30	159.90	1381.91	1381.91	4.55	4.44 S	1.12 E	4.58@	165.83	0.00	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS											
1491.00	2.02	167.89	1490.86	1490.86	7.67	7.48 S	1.95 E	7.73@	165.40	0.69	104.64
1674.00	1.32	189.25	1673.79	1673.79	12.90	12.72 S	2.29 E	12.92@	169.80	0.51	108.25
1866.00	0.70	211.92	1865.76	1865.76	15.93	15.89 S	1.31 E	15.95@	175.28	0.38	111.87
2057.00	1.14	214.21	2056.73	2056.73	18.26	18.46 S	0.37 W	18.46@	181.16	0.23	115.48
2248.00	1.06	298.32	2247.71	2247.71	18.65	19.19 S	3.00 W	19.42@	188.88	0.77	115.48
2440.00	1.58	345.69	2439.66	2439.66	14.99	15.78 S	5.22 W	16.62@	198.29	0.61	119.09
2631.00	1.06	289.00	2630.62	2630.62	11.60	12.65 S	7.54 W	14.73@	210.78	0.70	119.09
2822.00	1.23	266.41	2821.58	2821.58	10.68	12.21 S	11.25 W	16.60@	222.67	0.25	119.09
3014.00	1.32	275.38	3013.53	3013.53	10.07	12.13 S	15.51 W	19.69@	231.98	0.11	122.71
3205.00	0.70	330.66	3204.51	3204.51	8.50	10.91 S	18.27 W	21.28@	239.17	0.57	126.32
3397.00	1.06	69.01	3396.49	3396.49	6.99	9.25 S	17.19 W	19.52@	241.72	0.70	126.32
3588.00	2.46	122.01	3587.41	3587.41	9.17	10.79 S	12.06 W	16.18@	228.20	1.05	119.09
3779.00	2.02	136.69	3778.26	3778.26	14.49	15.41 S	6.28 W	16.64@	202.17	0.38	119.09
3892.00	0.88	159.27	3891.22	3891.22	16.94	17.67 S	4.61 W	18.26@	194.61	1.11	119.09
4001.00	0.70	161.03	4000.21	4000.21	18.41	19.08 S	4.09 W	19.52@	192.11	0.17	108.25

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4192.00	0.79	164.99	4191.20	4191.20	20.86	21.46 S	3.37 W	21.72@	188.93	0.05	111.87
4383.00	0.97	186.61	4382.18	4382.18	23.73	24.34 S	3.22 W	24.55@	187.53	0.20	115.48
4574.00	0.97	188.54	4573.15	4573.15	26.86	27.54 S	3.64 W	27.78@	187.54	0.02	119.09
4765.00	0.97	34.03	4764.14	4764.14	27.20	27.80 S	2.98 W	27.96@	186.12	0.99	119.09
4956.00	1.14	28.76	4955.11	4955.11	24.45	24.79 S	1.16 W	24.82@	182.68	0.10	122.71
5147.00	1.06	40.27	5146.07	5146.07	21.72	21.78 S	0.90 E	21.80@	177.65	0.12	122.71
5338.00	1.06	24.63	5337.04	5337.04	19.03	18.83 S	2.77 E	19.03@	171.62	0.15	122.71
5529.00	1.23	16.72	5528.00	5528.00	15.65	15.26 S	4.10 E	15.80@	164.96	0.12	126.32
5720.00	1.23	12.15	5718.96	5718.96	11.85	11.29 S	5.12 E	12.40@	155.60	0.05	126.32
5912.00	0.97	8.72	5910.92	5910.92	8.34	7.67 S	5.80 E	9.62@	142.89	0.14	126.32
6103.00	1.23	76.75	6101.89	6101.89	6.57	5.60 S	8.04 E	9.80@	124.86	0.65	126.32
6294.00	0.70	358.79	6292.87	6292.87	5.20	3.96 S	10.01 E	10.77@	111.60	0.67	126.32
6486.00	0.18	290.93	6484.87	6484.87	3.89	2.68 S	9.71 E	10.07@	105.46	0.34	129.94
6676.00	0.18	179.67	6674.87	6674.87	4.05	2.88 S	9.43 E	9.86@	106.96	0.16	133.55
6868.00	0.70	161.91	6866.86	6866.86	5.50	4.29 S	9.80 E	10.69@	113.66	0.28	133.55
7059.00	1.14	163.14	7057.83	7057.83	8.52	7.22 S	10.71 E	12.92@	123.99	0.23	133.55
7251.00	0.62	262.81	7249.82	7249.82	10.40	9.18 S	10.23 E	13.74@	131.89	0.72	133.55
7443.00	0.53	219.48	7441.81	7441.81	11.01	9.99 S	8.64 E	13.21@	139.16	0.23	133.55
7634.00	0.97	197.07	7632.79	7632.79	13.09	12.22 S	7.60 E	14.39@	148.12	0.27	137.17
7826.00	1.49	187.66	7824.75	7824.75	16.98	16.25 S	6.79 E	17.61@	157.32	0.29	137.17
7850.00	3.08	177.73	7848.73	7848.73	17.92	17.20 S	6.77 E	18.49@	158.50	6.80	126.32
7882.00	8.18	175.54	7880.56	7880.56	21.05	20.33 S	6.99 E	21.50@	161.04	15.95	126.32
7914.00	11.87	174.48	7912.07	7912.07	26.62	25.88 S	7.48 E	26.94@	163.88	11.55	129.94
7946.00	14.07	175.01	7943.25	7943.25	33.80	33.03 S	8.13 E	34.02@	166.17	6.89	122.71
7978.00	16.44	178.52	7974.12	7974.12	42.19	41.43 S	8.59 E	42.32@	168.29	7.95	126.32
8010.00	19.35	178.70	8004.57	8004.57	51.97	51.26 S	8.83 E	52.02@	170.23	9.10	126.32
8042.00	23.13	175.54	8034.39	8034.39	63.52	62.83 S	9.44 E	63.54@	171.46	12.34	129.94
8073.00	27.70	174.13	8062.39	8062.39	76.81	76.08 S	10.65 E	76.82@	172.03	14.87	129.94

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8105.00	31.92	173.16	8090.15	8090.15	92.72	91.88 S	12.42 E	92.72@	172.30	13.27	133.55
8137.00	34.73	172.63	8116.88	8116.88	110.29	109.33 S	14.59 E	110.30@	172.40	8.83	133.55
8169.00	38.25	172.46	8142.60	8142.60	129.32	128.19 S	17.06 E	129.32@	172.42	11.00	133.55
8201.00	41.15	172.81	8167.22	8167.22	149.76	148.46 S	19.68 E	149.76@	172.45	9.09	133.55
8233.00	43.18	173.25	8190.94	8190.94	171.24	169.78 S	22.29 E	171.24@	172.52	6.41	133.55
8265.00	45.37	173.78	8213.85	8213.85	193.57	191.98 S	24.81 E	193.57@	172.64	6.94	137.17
8297.00	47.84	173.87	8235.83	8235.83	216.82	215.09 S	27.31 E	216.82@	172.76	7.72	137.17
8329.00	51.18	172.28	8256.61	8256.61	241.15	239.25 S	30.25 E	241.15@	172.79	11.10	137.17
8361.00	53.46	171.67	8276.17	8276.17	266.47	264.32 S	33.79 E	266.47@	172.72	7.28	137.17
8392.00	53.38	171.67	8294.64	8294.64	291.36	288.95 S	37.39 E	291.36@	172.63	0.26	137.17
8424.00	56.45	172.55	8313.03	8313.03	317.54	314.89 S	40.98 E	317.55@	172.58	9.85	137.17
8456.00	60.59	173.34	8329.74	8329.74	344.83	341.97 S	44.33 E	344.83@	172.61	13.11	137.17
8488.00	64.10	173.60	8344.59	8344.59	373.17	370.12 S	47.55 E	373.17@	172.68	10.99	137.17
8520.00	67.71	173.95	8357.65	8357.65	402.37	399.16 S	50.72 E	402.37@	172.76	11.33	140.78
8552.00	71.14	173.69	8368.90	8368.90	432.32	428.94 S	53.94 E	432.32@	172.83	10.75	140.78
8583.00	74.30	173.51	8378.10	8378.10	461.91	458.35 S	57.24 E	461.91@	172.88	10.21	140.78
8615.00	77.12	173.25	8386.00	8386.00	492.91	489.15 S	60.82 E	492.92@	172.91	8.85	140.78
8647.00	80.90	172.72	8392.10	8392.10	524.32	520.32 S	64.66 E	524.32@	172.92	11.92	140.78
8679.00	83.80	172.46	8396.36	8396.36	556.03	551.77 S	68.75 E	556.04@	172.90	9.10	140.78
8718.00	87.41	172.27	8399.35	8399.35	594.91	590.30 S	73.91 E	594.91@	172.86	9.27	133.55
8910.00	91.45	171.93	8401.26	8401.26	786.85	780.43 S	100.29 E	786.85@	172.68	2.11	137.17
9101.00	91.28	173.16	8396.71	8396.71	977.79	969.76 S	125.07 E	977.79@	172.65	0.65	137.17
9293.00	87.58	173.43	8398.62	8398.62	1169.74	1160.40 S	147.48 E	1169.74@	172.76	1.93	140.78
9484.00	89.16	172.99	8404.05	8404.05	1360.65	1349.98 S	170.05 E	1360.65@	172.82	0.86	144.39
9675.00	92.07	174.04	8402.00	8402.00	1551.60	1539.73 S	191.62 E	1551.60@	172.91	1.62	148.01
9866.00	91.54	177.12	8395.98	8395.98	1742.24	1730.04 S	206.33 E	1742.30@	173.20	1.63	148.01
10055.00	90.92	178.70	8391.93	8391.93	1930.41	1918.86 S	213.22 E	1930.67@	173.66	0.90	151.62
10244.00	91.71	179.14	8387.59	8387.59	2118.26	2107.78 S	216.78 E	2118.90@	174.13	0.48	148.01

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Subsea Depth (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)	TEMP (F)
10435.00	86.88	172.99	8389.94	8389.94	2308.77	2298.17 S	229.87 E	2309.63@	174.29	4.09	151.62
10627.00	86.97	171.14	8400.24	8400.24	2500.47	2488.05 S	256.34 E	2501.22@	174.12	0.96	155.24
10818.00	88.72	171.14	8407.42	8407.42	2691.26	2676.63 S	285.74 E	2691.83@	173.91	0.92	151.62
11010.00	89.87	169.21	8409.79	8409.79	2883.04	2865.78 S	318.50 E	2883.43@	173.66	1.17	144.39
11202.00	90.48	169.56	8409.20	8409.20	3074.71	3054.50 S	353.86 E	3074.92@	173.39	0.37	148.01
11393.00	93.21	170.26	8403.05	8403.05	3265.37	3242.43 S	387.31 E	3265.47@	173.19	1.48	151.62
11585.00	94.88	172.19	8389.51	8389.51	3456.81	3431.69 S	416.52 E	3456.87@	173.08	1.33	151.62
11776.00	91.36	173.25	8379.11	8379.11	3647.49	3620.84 S	440.68 E	3647.55@	173.06	1.92	151.62
11957.00	90.66	175.01	8375.92	8375.92	3828.40	3800.85 S	459.19 E	3828.49@	173.11	1.05	148.01
12084.00	91.28	176.85	8373.77	8373.77	3955.18	3927.51 S	468.20 E	3955.32@	173.20	1.53	151.62
12276.00	87.93	174.13	8375.09	8375.09	4146.90	4118.86 S	483.30 E	4147.12@	173.31	2.25	155.24
12467.00	88.72	175.18	8380.68	8380.68	4337.71	4308.95 S	501.08 E	4337.98@	173.37	0.69	158.85
12659.00	91.63	174.48	8380.09	8380.09	4529.55	4500.14 S	518.38 E	4529.90@	173.43	1.56	158.85
12745.00	92.59	175.01	8376.92	8376.92	4615.44	4585.72 S	526.25 E	4615.82@	173.45	1.27	158.85

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
9293.00	87.58	173.43	8398.62	-1160.40	147.48	1169.74	1169.74	172.76	1.93
9484.00	89.16	172.99	8404.05	-1349.98	170.05	1360.65	1360.65	172.82	.86
9675.00	92.07	174.04	8402.00	-1539.73	191.62	1551.60	1551.60	172.91	1.62
9866.00	91.54	177.12	8395.98	-1730.04	206.33	1742.24	1742.30	173.20	1.64
10055.00	90.92	178.70	8391.93	-1918.86	213.22	1930.41	1930.67	173.66	.90
10244.00	91.71	179.14	8387.59	-2107.78	216.78	2118.26	2118.90	174.13	.48
10435.00	86.88	172.99	8389.94	-2298.17	229.87	2308.77	2309.63	174.29	4.09
10627.00	86.97	171.14	8400.24	-2488.05	256.34	2500.47	2501.22	174.12	.86
10818.00	88.72	171.14	8407.42	-2676.63	285.74	2691.26	2691.83	173.91	.92
11010.00	89.87	169.21	8409.79	-2865.78	318.50	2883.04	2883.43	173.66	1.17
11202.00	90.48	169.56	8409.20	-3054.50	353.86	3074.71	3074.92	173.39	.37
11393.00	93.21	170.26	8403.05	-3242.42	387.31	3265.37	3265.47	173.19	1.48
11585.00	94.88	172.19	8389.51	-3431.69	416.52	3456.81	3456.87	173.08	1.33
11776.00	91.36	173.25	8379.11	-3620.84	440.68	3647.49	3647.55	173.06	1.92
11957.00	90.66	175.01	8375.92	-3800.85	459.19	3828.40	3828.49	173.11	1.05
12084.00	91.28	176.85	8373.77	-3927.51	468.20	3955.18	3955.32	173.20	1.53
12276.00	87.93	174.13	8375.09	-4118.86	483.30	4146.90	4147.12	173.31	2.25
12467.00	88.72	175.18	8380.68	-4308.95	501.08	4337.71	4337.98	173.37	.69
12659.00	91.63	174.48	8380.09	-4500.14	518.38	4529.55	4529.90	173.43	1.56
57' RIGHT, 12.87' BELOW									
12745.00	92.59	175.01	8376.92	-4585.72	526.25	4615.44	4615.82	173.45	1.27
STRAIGHT-LINE PROJECTION TO BIT @ TD									
12800.00	92.59	175.01	8374.44	-4640.46	531.03	4670.34	4670.74	173.47	.00

COMPLETED WELL SKETCH

DEPTH (ft)	MARKERS (KB)	LITHOLOGY	OGRID: API: 30-015-39099 AFE: 104736 SPUD: 6/9/11 @ 20 30 hrs FRR: 7/4/11 @ 11 00 hrs RIG: Cactus #123	Ross Draw 8 Federal #2H Wildcat (Bone Spring) Field Eddy County, New Mexico	SURF: 330' FNL & 2240' FEL LOC: Sec 8 SURVEY: T-26-S, R-31-E GL: 3286.1' KB: 3316.1' ZERO: 30' 0" AGL	HOLE SIZE	MW (ppg)	MUD	BHST (°F)	LOT (ppg)	EVALUATION
1,000'				20" Conductor @ 130'		17-1/2"	8.4	FW		N/A	Mud Log
	Rustler - 1375' T / Salt - 1760'			Surface Casing @ 1,428' 13-3/8" 54 5# J-55 STC Cement w/ 750 sx Class C (13 5 ppg, 1 73 yld) followed by 300 sx Class C + 1 0% CaCl2 (14 8 ppg, 1 33 yld). Bump plug w/ 1032 psi and circ 550 sx to surface		10 0			86		
2,000'		Salt				12-1/4"		Brine		NA	
3,000'	B / Salt - 3790'			Intermediate Casing @ 3,943' 9-5/8", 40#, J-55, LT&C Cement w/ 825 sx Class C + 2 0% SMS + 10% Salt + 1 2% R-3 + 0 25 pps Celloflake + 0 005 pps Static Free (12 7 ppg, 2 19 yld), followed by 200 sx Class C + 0 60% FL-62 + 0 50% CD-32 + 0 15% SMS (14 8 ppg, 1 332 yld). Bump plug w/ 1750 psi, but did not circ cement		10 2				117	
4,000'	Lamar - 4000' Bell Canyon - 4030'			Perforations Measured Depth 8808, 8863, 8912, 8964, 9011, 9068, 9120, 9172, 9224, 9276, 9326, 9380, 9432, 9484, 9538, 9588 9640, 9694, 9744, 9796, 9842, 9900, 9952, 10000, 10056, 10108, 10160, 10212, 10264, 10316, 10370, 10420, 10472, 10530, 10576, 10628, 10680, 10732, 10784, 10836, 10890, 10940, 10992, 11050, 11096, 11148, 11198, 11252, 11304, 11356, 11408, 11460, 11512, 11564, 11616, 11668, 11720, 11772, 11824, 11876, 11928, 11980, 12032, 12084, 12136, 12188, 12240, 12292, 12344, 12396, 12448, 12500, 12552, 12604		8 4			N/A	BHC Sonic / GR-HRLA-MSFL / HNGS-CN-LDT w/ Pe Mud Log	
5,000'	Cherry Canyon - 4940'					8 3/4"		WBM			
6,000'	Brushy Canyon - 6270'			Cement KO Plug 7600' - 8200' 350 sx Class H + 1.20% CD-32 + 0.14% R-3	Production Casing @ 12,786' MD, 8374' TVD 5-1/2" 20# HCP-110 NSCC Cement w/ 175 sx 60 40' Class C + 15 0 pps BA-90 + 4 0% MPA-5 + 3 0% SMS + 5 0% A-10 + 1 0% BA-10A + 0 80% ASA-301 + 2 8% R-21 + 8 0 pps LCM-1 (10 8 ppg, 3 677 yld), followed by 500 sx 50 50.10 Class H + 0 80% FL-32 + 0 30% ASA-301 + 0 50% SMS + 2 0% Salt + 0 60% R-21 + 3 0 pps LCM-1 + 0 25 pps Celloflake (11 8 ppg), followed by 1200 sx 50 50 2 Class H + 0 65% FL-52 + 0 45% CD-32 + 0 15% SMS + 2 0% Salt (14 2 ppg, 1 277 yld). Bump plug w/ 1500 psi Did not circ cement				9 3		
7,000'				Cement Plug 9032' - 9300' (Tag @ 9032') 150 sx Class H + 1.2% CD-32 + 0 10% R-3							140
8,000'	Bone Spring Lime - 7960'			Pilot Hole TD @ 9,300'							
9,000'	1st Bone Spring Sand - 8920' Bone Spring 2 Carb - 9280'										
PTD - ~9,300'											
						Drlg Eng:		R Willett			
						Date:		5/16/2012			