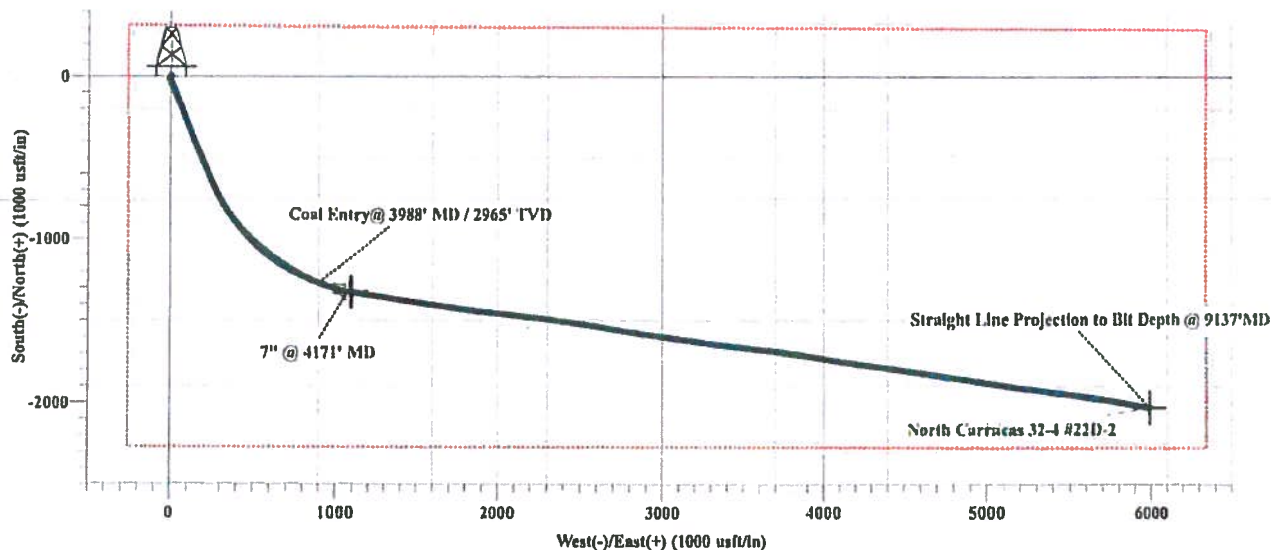


North Carracas 32-4 #22D-2
Sec21 T32N R04W
Archuleta Co., CO

GE: 6128' / KB: 20'

PATHFINDER
A Schlumberger Company



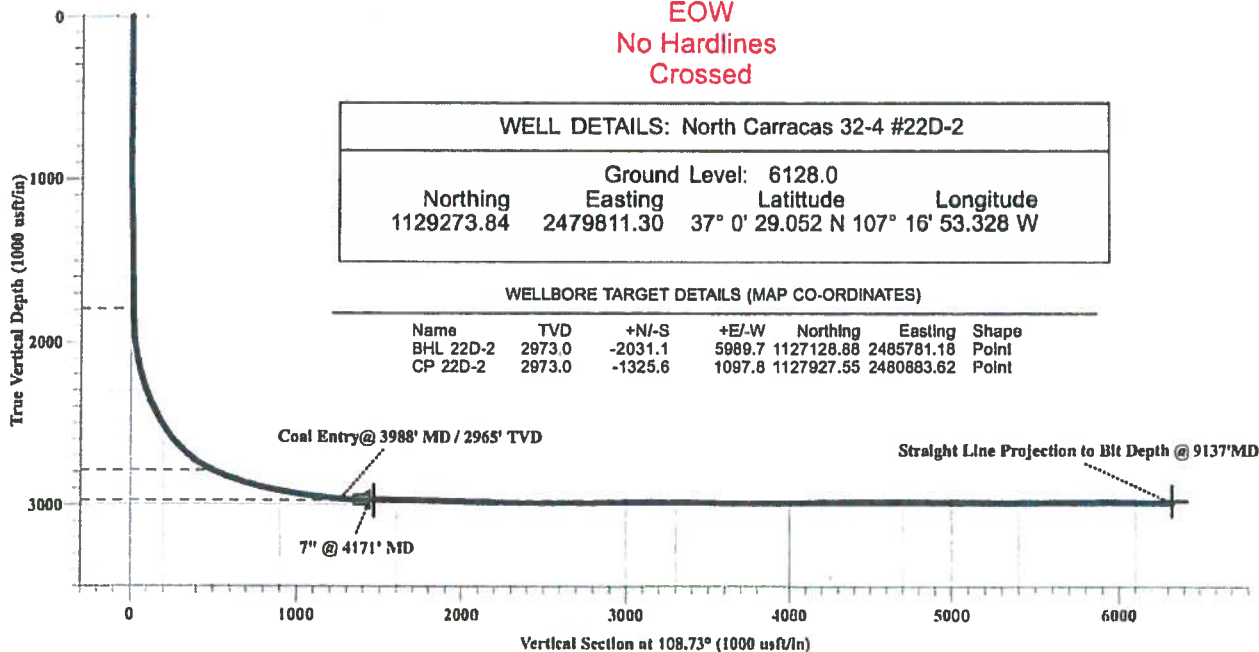
**EOW
No Hardlines
Crossed**

WELL DETAILS: North Carracas 32-4 #22D-2

Ground Level: 6128.0
<div> <div> Northing 1129273.84 </div> <div> Easting 2479811.30 </div> <div> Latitude 37° 0' 29.052 N </div> <div> Longitude 107° 16' 53.328 W </div> </div>

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
BHL 22D-2	2973.0	-2031.1	5989.7	1127128.88	2485781.18	Point
CP 22D-2	2973.0	-1325.6	1097.8	1127927.55	2480883.62	Point



SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	V Sect	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
1800.0	0.00	0.00	1800.0	0.0	0.0	0.00	0.00	0.0	
3104.2	72.61	158.44	2782.1	-871.0	285.2	5.57	158.44	466.6	
3127.9	72.61	158.44	2789.2	-692.1	273.5	0.00	0.00	481.2	
4236.5	90.00	98.21	2973.0	-1325.6	1097.8	5.57	-80.30	1465.4	CP 22D-2
9179.0	90.00	98.21	2973.0	-2031.1	5989.7	0.00	0.00	6324.7	BHL 22D-2

**Provided as a Courtesy
of Southern Ute
Tribal Government**

Plan: Design #2 (North Carracas 32-4 #22D-2/Wellbore #1)

Created By: Breck Enoch Date: 05-Apr-2012



Red Willow Production Company

Archuleta Co., CO

Sec21 T32N R04W

North Carracas 32-4 #22D-2

Wellbore #1

Design: Wellbore #1

Standard Survey Report

05 April, 2012

PATHFINDER
A Schlumberger Company

Provided as a Courtesy
of Southern Ute
Tribal Government



Pathfinder Survey Report

PATHFINDER
A Schlumberger Company

Company: Red Willow Production Company
Project: Archuleta Co., CO
Site: Sec21 T32N R04W
Well: North Carracas 32-4 #22D-2
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Carracas 32-4 #22D-2
TVD Reference: WELL @ 8148.0usft (Original Well Elev)
MD Reference: WELL @ 8148.0usft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project	Archuleta Co., CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Southern Zone		

Site Sec21 T32N R04W

Site Position:		Northing:	1,129,270.40 usft	Latitude:	37° 0' 29.052 N
From:	Lat/Long	Easting:	2,479,992.31 usft	Longitude:	107° 16' 51.096 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.09 "

Well North Carracas 32-4 #22D-2

Well Position	+N/-S	0.0 usft	Northing:	1,129,273.84 usft	Latitude:	37° 0' 29.052 N
	+E/-W	0.0 usft	Easting:	2,479,811.29 usft	Longitude:	107° 16' 53.328 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	6,128.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2010	2012/02/20	(°)	(°)	(nT)
			9.64	63.77	50,886

Design Wellbore #1

Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
-----------------	-----	---------------	--------	----------------------	-----

Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	109.86

Survey Program Date 2012/04/04

From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
871.0	8,493.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard
8,524.0	9,137.0	Survey #2 (Wellbore #1)	MWD	MWD - Standard

Survey

Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
871.0	1.93	205.42	870.8	-13.2	-6.3	-1.4	0.22	0.22	0.00
899.0	1.85	206.94	898.8	-14.1	-6.7	-1.5	0.34	-0.29	5.43
931.0	1.85	204.94	930.8	-15.0	-7.2	-1.6	0.20	0.00	-6.25
982.0	2.46	174.42	981.8	-16.1	-7.3	-1.4	4.12	1.97	-98.45
995.0	2.90	171.18	994.7	-17.7	-7.1	-0.7	1.41	1.33	-9.88
1,028.0	2.99	173.87	1,025.7	-19.2	-6.9	0.0	0.51	0.29	8.10
1,058.0	2.99	189.80	1,057.7	-20.9	-6.7	0.8	0.63	0.00	-12.09
1,090.0	2.11	155.39	1,089.6	-22.2	-8.3	1.7	3.38	-2.75	-45.03
1,122.0	1.85	150.40	1,121.6	-23.2	-5.8	2.5	0.97	-0.81	-15.59



Pathfinder Survey Report

PATHFINDER
A Schlumberger Company

Company: Red Willow Production Company
Project: Archuleta Co., CO
Site: Sec21 T32N R04W
Well: North Carracas 32-4 #22D-2
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Carracas 32-4 #22D-2
TVD Reference: WELL @ 8148.0usft (Original Well Elev)
MD Reference: WELL @ 8148.0usft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
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)
1,154.0	1.76	156.58	1,153.6	-24.1	-5.3	3.2	0.87	-0.28	19.31
1,186.0	1.85	157.64	1,185.8	-25.1	-4.9	3.9	0.30	0.28	3.31
1,218.0	1.85	155.93	1,217.6	-28.0	-4.5	4.6	0.17	0.00	-5.34
1,250.0	1.87	159.96	1,249.5	-28.9	-4.1	5.2	0.88	-0.58	12.69
1,313.0	1.76	154.09	1,312.5	-28.8	-3.4	6.5	0.31	0.14	-9.32
1,345.0	1.93	157.87	1,344.5	-29.8	-3.0	7.2	0.65	0.53	11.81
1,377.0	1.85	159.30	1,376.5	-30.6	-2.6	7.9	0.29	-0.25	4.47
1,409.0	1.85	158.77	1,408.5	-31.5	-2.2	8.8	0.05	0.00	-1.68
1,440.0	1.76	160.41	1,439.5	-32.4	-1.9	9.2	0.33	-0.29	5.29
1,472.0	1.78	154.09	1,471.4	-33.4	-1.5	9.9	0.61	0.00	-19.75
1,504.0	1.78	154.42	1,503.4	-34.2	-1.1	10.8	0.03	0.00	1.03
1,538.0	1.87	155.40	1,535.4	-35.1	-0.7	11.3	0.30	-0.28	3.06
1,587.0	1.58	155.89	1,586.4	-35.9	-0.3	11.9	0.29	-0.29	1.58
1,599.0	1.58	164.74	1,598.4	-36.7	0.0	12.5	0.78	0.00	27.66
1,631.0	1.58	159.45	1,630.4	-37.8	0.3	13.0	0.48	0.00	-16.63
1,682.0	1.49	158.08	1,681.4	-38.3	0.8	13.5	0.31	-0.29	-4.42
1,694.0	1.49	165.22	1,693.3	-39.1	0.8	14.1	0.58	0.00	22.31
1,728.0	1.41	185.03	1,725.3	-39.9	1.0	14.5	0.25	-0.25	-0.59
1,758.0	1.23	157.44	1,757.3	-40.8	1.3	15.0	0.78	-0.56	-23.72
1,789.0	1.32	187.63	1,788.3	-41.3	1.5	15.4	0.79	0.29	32.87
1,821.0	1.14	185.15	1,820.3	-41.9	1.6	15.8	0.59	-0.58	-7.75
1,853.0	2.55	154.18	1,852.3	-42.9	2.0	18.5	4.52	4.41	-34.34
1,884.0	4.31	157.40	1,883.2	-44.8	2.6	17.7	5.71	5.68	10.45
1,916.0	5.89	158.88	1,915.1	-47.2	3.8	19.8	4.95	4.94	4.83
1,948.0	7.58	158.87	1,946.9	-50.7	5.2	22.1	5.22	5.22	-0.03
1,979.0	9.15	160.81	1,977.6	-54.9	8.7	25.0	5.19	5.13	5.61
2,011.0	10.99	180.05	2,009.1	-80.2	8.8	28.8	5.76	5.75	-1.75
2,043.0	12.75	158.41	2,040.4	-88.4	10.9	32.8	5.60	5.50	-5.13
2,075.0	14.51	158.05	2,071.5	-73.3	13.9	38.0	5.77	5.50	-7.38
2,108.0	16.36	156.28	2,101.4	-80.9	17.2	43.7	5.97	5.97	0.74
2,137.0	17.94	156.40	2,131.0	-89.2	20.9	49.9	5.10	5.10	0.39
2,168.0	19.70	155.68	2,160.3	-98.4	24.9	58.9	5.73	5.68	-2.32
2,198.0	21.37	155.39	2,188.4	-107.9	29.3	64.2	5.58	5.57	-0.97
2,229.0	22.95	155.14	2,217.1	-118.8	34.2	72.4	5.11	5.10	-0.81
2,259.0	24.53	155.68	2,244.6	-129.5	39.2	80.9	5.32	5.27	1.80
2,290.0	28.58	155.88	2,272.8	-141.7	44.7	90.2	8.55	6.55	0.85
2,321.0	28.87	156.24	2,300.0	-154.9	50.5	100.1	6.83	6.81	1.16
2,351.0	30.69	157.28	2,326.1	-188.5	56.4	110.3	6.95	6.73	3.47
2,382.0	32.10	158.91	2,352.5	-183.5	62.4	121.0	5.31	4.55	5.28
2,412.0	33.94	158.45	2,377.7	-198.7	88.3	131.8	8.19	6.13	-1.53
2,443.0	35.35	159.67	2,403.2	-215.2	74.6	143.3	5.07	4.65	3.94
2,474.0	37.28	159.25	2,428.2	-232.4	81.1	155.2	8.28	6.23	-1.35
2,504.0	38.87	159.85	2,451.8	-249.7	87.8	167.2	5.38	5.30	1.33



Pathfinder Survey Report

PATHFINDER
A Schlumberger Company

Company: Red Willow Production Company
Project: Archuleta Co., CO
Site: Sec21 T32N R04W
Well: North Carracas 32-4 #22D-2
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Carracas 32-4 #22D-2
TVD Reference: WELL @ 8148.0usft (Original Well Elev)
MD Reference: WELL @ 6148.0usft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
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)
2,535.0	40.80	159.10	2,475.8	-288.3	94.6	180.1	6.33	6.23	-1.77
2,566.0	42.56	159.11	2,498.8	-287.5	101.9	193.6	5.68	5.68	0.03
2,598.0	44.14	158.60	2,520.6	-306.8	109.4	207.1	5.39	5.27	-1.70
2,827.0	45.73	158.15	2,542.5	-327.1	117.4	221.6	5.23	5.13	-1.45
2,858.0	47.31	157.41	2,563.8	-347.9	125.9	236.7	5.38	5.10	-2.39
2,888.0	49.24	157.45	2,583.8	-368.6	134.5	251.8	6.43	6.43	0.13
2,719.0	51.00	156.49	2,603.7	-390.5	143.8	268.0	6.15	5.68	-3.10
2,750.0	52.76	158.54	2,822.8	-412.9	153.6	284.7	5.68	5.68	0.16
2,780.0	54.08	156.46	2,640.7	-435.0	163.2	301.2	4.41	4.40	-0.27
2,811.0	56.01	156.57	2,658.5	-458.3	173.3	318.7	6.23	6.23	0.35
2,842.0	57.77	156.64	2,875.4	-482.1	183.6	338.5	5.68	5.68	0.23
2,872.0	59.44	156.87	2,691.0	-505.6	193.7	354.0	5.57	5.57	0.10
2,903.0	61.11	156.95	2,708.4	-530.3	204.3	372.4	5.44	5.39	0.90
2,934.0	62.87	156.67	2,720.9	-555.5	215.1	391.1	5.73	5.68	-0.90
2,964.0	64.90	158.80	2,734.2	-580.2	225.8	409.5	6.78	6.77	0.43
2,995.0	68.65	158.71	2,746.9	-608.2	236.9	428.8	5.65	5.65	-0.28
3,026.0	68.32	157.17	2,758.7	-832.8	248.1	448.3	5.56	5.39	1.48
3,056.0	69.58	158.92	2,769.5	-858.3	259.0	467.3	4.21	4.13	-0.83
3,087.0	71.05	156.17	2,780.0	-885.1	270.7	487.3	5.32	4.81	-2.42
3,118.0	71.67	154.85	2,789.9	-711.8	282.9	507.9	5.08	2.00	-4.90
3,148.0	72.28	152.68	2,799.2	-737.4	295.5	528.5	6.57	2.03	-6.57
3,179.0	72.81	150.94	2,808.5	-763.5	309.5	550.5	5.62	1.71	-5.61
3,209.0	72.98	148.88	2,817.3	-788.3	323.9	572.4	6.59	0.57	-6.87
3,240.0	73.25	147.08	2,826.3	-813.4	339.8	595.8	5.68	0.87	-5.87
3,271.0	73.60	145.50	2,835.1	-838.1	358.1	619.7	4.95	1.13	-5.03
3,301.0	74.22	143.88	2,843.4	-861.6	372.8	643.4	5.58	2.07	-5.40
3,332.0	74.83	142.03	2,851.7	-885.5	390.8	668.4	6.08	1.97	-5.97
3,363.0	75.27	140.40	2,859.7	-908.8	409.5	694.0	5.27	1.42	-5.26
3,393.0	75.53	138.35	2,867.3	-930.9	428.4	719.2	6.67	0.87	-6.83
3,424.0	75.97	136.86	2,874.9	-953.1	448.7	745.8	4.87	1.42	-4.81
3,455.0	76.85	135.48	2,882.2	-974.8	469.6	772.8	5.23	2.84	-4.52
3,485.0	77.47	133.99	2,888.9	-995.4	490.3	799.4	5.21	2.07	-4.90
3,516.0	77.73	132.27	2,895.5	-1,016.1	512.4	827.2	5.48	0.84	-5.55
3,547.0	78.08	131.31	2,902.0	-1,038.3	535.0	855.3	3.23	1.13	-3.10
3,577.0	79.14	130.52	2,907.9	-1,055.5	557.3	882.7	4.38	3.53	-2.63
3,608.0	79.84	129.12	2,913.6	-1,075.0	580.7	911.4	4.98	2.26	-4.52
3,639.0	80.20	127.87	2,919.0	-1,094.0	604.6	940.3	4.75	1.16	-4.88
3,669.0	80.64	128.87	2,924.0	-1,111.9	628.2	968.8	3.60	1.47	-3.33
3,700.0	80.90	125.89	2,928.9	-1,130.0	652.8	997.9	2.62	0.84	-2.52
3,731.0	81.34	124.50	2,933.7	-1,147.8	677.9	1,027.5	4.65	1.42	-4.48
3,761.0	81.87	122.91	2,938.1	-1,164.1	702.8	1,056.3	5.53	1.77	-5.30
3,792.0	82.22	122.46	2,942.4	-1,180.7	728.4	1,086.2	1.83	1.13	-1.45
3,823.0	82.88	121.00	2,946.5	-1,198.8	754.5	1,116.3	4.88	1.42	-4.71



Pathfinder Survey Report



Company: Red Willow Production Company
Project: Archuleta Co., CO
Site: Sec21 T32N R04W
Well: North Carracas 32-4 #22D-2
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Carracas 32-4 #22D-2
TVD Reference: WELL @ 8148.0usft (Original Well Elev)
MD Reference: WELL @ 8148.0usft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
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)
3,853.0	83.01	119.10	2,950.2	-1,211.7	780.3	1,145.6	6.39	1.17	-8.33
3,884.0	83.36	117.38	2,953.9	-1,226.3	807.4	1,178.0	5.62	1.13	-5.55
3,915.0	83.45	115.32	2,957.4	-1,240.0	835.0	1,206.6	6.61	0.29	-6.65
3,945.0	84.15	113.14	2,960.7	-1,252.2	862.2	1,238.4	7.59	2.33	-7.27
3,978.0	84.06	111.31	2,963.9	-1,283.9	890.7	1,287.2	5.88	-0.29	-5.90
3,988.0	84.88	110.89	2,965.1	-1,268.2	901.9	1,279.1	7.24	5.13	-5.14
Coal Entry @ 3988' MD / 2965' TVD									
4,007.0	85.65	109.72	2,966.7	-1,274.7	919.7	1,298.1	7.24	5.13	-5.12
4,037.0	87.32	109.29	2,988.5	-1,284.7	947.9	1,328.0	5.75	5.57	-1.43
4,068.0	88.81	108.56	2,969.5	-1,284.7	977.2	1,359.0	5.35	4.81	-2.35
4,098.0	89.52	107.06	2,970.0	-1,303.9	1,005.8	1,388.9	5.53	2.37	-5.00
4,129.0	89.78	104.85	2,970.2	-1,312.4	1,035.6	1,419.9	7.18	0.84	-7.13
4,171.0	89.83	101.83	2,970.3	-1,322.1	1,076.4	1,461.8	7.88	0.13	-7.68
7"									
4,199.0	89.87	99.49	2,970.4	-1,327.2	1,104.0	1,489.2	7.68	0.13	-7.68
4,231.0	89.80	98.44	2,970.5	-1,332.2	1,135.8	1,520.8	3.39	-0.84	-3.28
4,262.0	90.22	98.18	2,970.8	-1,338.7	1,166.2	1,551.0	2.17	2.00	-0.84
4,294.0	89.43	98.15	2,970.7	-1,341.2	1,197.9	1,582.3	2.47	-2.47	-0.09
4,328.0	89.25	98.98	2,971.0	-1,348.0	1,229.8	1,613.7	2.85	-0.58	2.59
4,357.0	88.99	99.20	2,971.5	-1,350.9	1,260.2	1,644.2	1.10	-0.84	0.71
4,389.0	89.78	98.74	2,971.9	-1,355.9	1,291.8	1,675.6	2.88	2.47	-1.44
4,421.0	90.48	98.87	2,971.8	-1,360.8	1,323.4	1,707.0	2.22	2.19	0.41
4,452.0	90.92	98.95	2,971.4	-1,385.8	1,354.0	1,737.4	1.44	1.42	0.26
4,484.0	90.48	99.24	2,971.0	-1,370.8	1,385.8	1,768.9	1.65	-1.38	0.91
4,516.0	89.08	99.32	2,971.1	-1,375.8	1,417.2	1,800.3	4.38	-4.38	0.25
4,548.0	88.02	98.61	2,972.0	-1,380.8	1,448.8	1,831.7	3.99	-3.31	-2.22
4,580.0	87.49	98.84	2,973.2	-1,385.6	1,480.4	1,863.1	1.66	-1.86	0.09
4,612.0	87.87	98.67	2,974.6	-1,390.4	1,512.0	1,894.5	0.57	0.58	0.09
4,643.0	87.93	98.11	2,975.7	-1,394.9	1,542.7	1,924.8	1.99	0.84	-1.81
4,675.0	87.85	98.33	2,978.9	-1,399.5	1,574.3	1,958.1	0.73	-0.25	0.89
4,707.0	88.72	97.64	2,977.9	-1,403.9	1,606.0	1,987.4	3.47	2.72	-2.16
4,738.0	89.34	98.13	2,976.4	-1,408.2	1,636.7	2,017.8	2.55	2.00	1.58
4,770.0	89.25	98.37	2,978.8	-1,412.7	1,668.3	2,049.1	0.80	-0.28	0.75
4,802.0	89.25	98.23	2,979.2	-1,417.4	1,700.0	2,080.4	0.44	0.00	-0.44
4,834.0	89.08	98.20	2,979.7	-1,421.9	1,731.7	2,111.8	0.54	-0.53	-0.09
4,865.0	89.34	97.78	2,980.1	-1,428.2	1,762.4	2,142.1	1.59	0.84	-1.35
4,897.0	88.48	97.71	2,980.7	-1,430.6	1,794.1	2,173.4	2.78	-2.75	-0.22
4,929.0	88.29	97.43	2,981.6	-1,434.8	1,825.8	2,204.7	1.02	-0.53	-0.88
4,960.0	88.64	98.87	2,982.5	-1,438.8	1,856.5	2,234.9	2.13	1.13	-1.81
4,992.0	88.72	98.68	2,983.2	-1,442.4	1,888.3	2,266.0	0.70	0.25	-0.66
5,024.0	88.55	96.71	2,984.0	-1,448.1	1,920.1	2,297.2	0.55	-0.53	0.16
5,056.0	88.55	96.10	2,984.8	-1,449.7	1,951.9	2,328.3	1.91	0.00	-1.91
5,087.0	88.48	95.58	2,985.8	-1,452.8	1,982.7	2,358.4	1.70	-0.29	-1.88
5,119.0	88.48	95.57	2,986.4	-1,455.9	2,014.5	2,389.4	0.03	0.00	-0.03



Pathfinder Survey Report

PATHFINDER
A Schlumberger Company

Company: Red Willow Production Company
Project: Archuleta Co., CO
Site: Sec21 T32N R04W
Well: North Carracas 32-4 #22D-2
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Carracas 32-4 #22D-2
TVD Reference: WELL @ 6148.0usft (Original Well Elev)
MD Reference: WELL @ 6148.0usft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
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)
5,151.0	88.81	98.03	2,987.2	-1,459.2	2,046.4	2,420.4	1.81	1.09	1.44
5,182.0	89.78	98.73	2,987.6	-1,482.8	2,077.2	2,450.5	3.86	3.13	2.28
5,214.0	90.88	97.29	2,987.5	-1,488.5	2,108.9	2,481.7	3.26	2.75	1.75
5,246.0	90.57	97.15	2,987.1	-1,470.8	2,140.7	2,513.0	0.52	-0.28	-0.44
5,277.0	90.40	96.85	2,988.9	-1,474.3	2,171.4	2,543.2	1.11	-0.55	-0.97
5,309.0	90.40	96.58	2,988.8	-1,478.1	2,203.2	2,574.3	0.84	0.00	-0.64
5,341.0	90.68	98.64	2,986.3	-1,481.8	2,235.0	2,605.5	0.83	0.81	0.19
5,373.0	89.96	97.77	2,986.2	-1,485.8	2,266.7	2,638.7	4.15	-2.19	3.53
5,404.0	90.13	97.81	2,988.1	-1,490.0	2,297.5	2,667.0	0.56	0.55	0.13
5,436.0	90.57	98.13	2,985.9	-1,494.4	2,329.2	2,698.3	1.70	1.38	1.00
5,468.0	90.48	98.23	2,985.7	-1,499.0	2,360.8	2,729.7	0.42	-0.28	0.31
5,499.0	90.84	97.94	2,985.3	-1,503.3	2,391.5	2,760.0	1.49	1.16	-0.94
5,531.0	90.48	97.63	2,984.9	-1,507.7	2,423.2	2,791.3	1.48	-1.13	-0.97
5,562.0	90.84	97.19	2,984.8	-1,511.7	2,454.0	2,821.6	1.83	1.16	-1.42
5,594.0	91.38	97.88	2,984.0	-1,515.8	2,485.7	2,852.8	2.23	1.63	1.53
5,626.0	91.83	98.98	2,983.1	-1,520.4	2,517.3	2,884.2	4.15	0.84	4.06
5,657.0	91.54	100.21	2,982.3	-1,525.8	2,547.9	2,914.7	3.98	-0.29	3.97
5,689.0	90.86	100.51	2,981.7	-1,531.3	2,579.4	2,948.2	2.91	-2.75	0.94
5,721.0	91.01	100.80	2,981.2	-1,537.2	2,610.8	2,977.8	1.13	1.09	0.28
5,752.0	90.68	100.65	2,980.7	-1,542.9	2,641.3	3,008.4	1.14	-1.13	0.18
5,784.0	91.19	100.38	2,980.2	-1,548.8	2,672.7	3,040.0	1.88	1.88	-0.84
5,816.0	90.31	100.45	2,979.8	-1,554.5	2,704.2	3,071.5	2.78	-2.75	0.22
5,847.0	89.69	99.58	2,979.8	-1,559.9	2,734.7	3,102.1	3.45	-2.00	-2.81
5,879.0	89.80	99.45	2,980.0	-1,565.2	2,768.3	3,133.5	0.49	-0.28	-0.41
5,911.0	89.60	98.95	2,980.2	-1,570.3	2,797.9	3,165.0	1.56	0.00	-1.58
5,943.0	89.78	98.60	2,980.4	-1,575.2	2,829.5	3,196.4	1.23	0.56	-1.09
5,974.0	90.84	98.68	2,980.2	-1,579.9	2,860.2	3,226.8	3.43	3.42	0.26
6,006.0	90.40	98.24	2,979.9	-1,584.6	2,891.8	3,258.2	1.94	-1.38	-1.38
6,038.0	90.86	98.18	2,979.8	-1,589.2	2,923.5	3,289.5	0.85	0.81	-0.25
6,070.0	90.57	98.63	2,979.2	-1,593.8	2,955.1	3,320.9	1.50	-0.28	1.47
6,101.0	89.25	98.24	2,979.3	-1,608.4	2,985.8	3,351.2	4.44	-4.26	-1.28
6,133.0	88.99	98.07	2,979.6	-1,602.9	3,017.5	3,382.8	0.97	-0.81	-0.53
6,165.0	88.72	97.89	2,980.4	-1,607.3	3,049.1	3,413.9	1.01	-0.84	-0.56
6,196.0	88.64	97.74	2,981.1	-1,611.6	3,079.9	3,444.2	0.55	-0.28	-0.48
6,228.0	88.46	97.33	2,981.9	-1,615.8	3,111.6	3,475.4	1.40	-0.56	-1.28
6,260.0	89.43	97.77	2,982.5	-1,620.0	3,143.3	3,506.7	3.33	3.03	1.38
6,292.0	89.78	98.10	2,982.8	-1,624.4	3,175.0	3,538.0	1.50	1.09	1.03
6,324.0	86.99	98.31	2,983.1	-1,628.9	3,206.6	3,569.3	2.55	-2.47	0.66
6,356.0	89.43	98.40	2,983.5	-1,633.8	3,238.3	3,600.7	1.40	1.38	0.28
6,388.0	88.72	97.89	2,984.1	-1,638.1	3,270.0	3,632.0	2.73	-2.22	-1.59
6,420.0	87.93	97.00	2,985.0	-1,642.3	3,301.7	3,663.3	3.72	-2.47	-2.78
6,451.0	88.55	96.85	2,985.9	-1,646.0	3,332.5	3,693.5	2.08	2.00	-0.48
6,483.0	89.78	97.12	2,986.4	-1,649.9	3,364.2	3,724.7	3.94	3.84	0.84



Pathfinder Survey Report

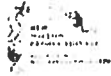
PATHFINDER
A Schlumberger Company

Company: Red Willow Production Company
Project: Archuleta Co., CO
Site: Sec21 T32N R04W
Well: North Carracas 32-4 #22D-2
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Carracas 32-4 #22D-2
TVD Reference: WELL @ 6148.0usft (Original Well Elev)
MD Reference: WELL @ 6148.0usft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
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)
6,515.0	90.31	97.10	2,988.4	-1,653.9	3,398.0	3,755.9	1.66	1.86	-0.06
6,546.0	90.31	98.96	2,986.2	-1,657.7	3,426.7	3,786.1	0.45	0.00	-0.45
6,578.0	90.04	98.53	2,988.1	-1,661.4	3,458.5	3,817.3	1.59	-0.84	-1.34
6,610.0	90.84	98.32	2,985.9	-1,685.0	3,490.3	3,848.4	2.58	2.50	-0.86
6,642.0	91.38	98.19	2,985.3	-1,668.5	3,522.1	3,879.5	1.87	1.63	-0.41
6,674.0	91.45	98.19	2,984.5	-1,871.9	3,553.9	3,910.6	0.28	0.28	0.00
6,708.0	89.78	98.23	2,984.1	-1,876.4	3,585.7	3,941.6	5.22	-5.22	0.13
6,738.0	89.69	95.72	2,984.3	-1,878.7	3,617.5	3,972.7	1.82	-0.28	-1.59
6,770.0	90.13	95.46	2,984.3	-1,881.8	3,649.4	4,003.7	1.80	1.38	-0.81
6,802.0	90.31	96.22	2,984.2	-1,685.1	3,881.2	4,034.8	2.44	0.58	2.38
6,834.0	90.31	97.23	2,984.0	-1,886.8	3,713.0	4,085.9	3.18	0.00	3.18
6,866.0	90.84	98.08	2,983.7	-1,693.1	3,744.7	4,097.2	3.13	1.86	2.86
6,897.0	91.01	98.37	2,983.2	-1,697.5	3,775.4	4,127.8	1.08	0.55	0.94
6,929.0	91.36	98.29	2,982.5	-1,702.2	3,807.1	4,158.9	1.12	1.09	-0.25
6,960.0	90.40	99.11	2,982.1	-1,706.9	3,837.7	4,189.3	4.07	-3.10	2.65
6,991.0	90.31	99.46	2,981.9	-1,711.9	3,868.3	4,219.8	1.17	-0.29	1.13
7,021.0	90.22	99.31	2,981.7	-1,716.8	3,897.9	4,249.3	0.58	-0.30	-0.50
7,052.0	90.48	99.23	2,981.8	-1,721.7	3,926.5	4,279.8	0.88	0.84	-0.26
7,083.0	90.66	99.28	2,981.2	-1,726.7	3,959.1	4,310.2	0.60	0.58	0.18
7,113.0	90.68	99.54	2,980.9	-1,731.8	3,980.7	4,339.7	0.87	0.00	0.87
7,144.0	90.75	99.42	2,980.5	-1,738.7	4,019.2	4,370.2	0.48	0.29	-0.39
7,174.0	91.28	99.53	2,980.0	-1,741.7	4,048.8	4,399.7	1.80	1.77	0.37
7,205.0	90.75	99.55	2,979.4	-1,748.8	4,079.4	4,430.2	1.71	-1.71	0.08
7,238.0	89.52	98.79	2,979.4	-1,751.8	4,110.0	4,460.7	4.68	-3.97	-2.45
7,267.0	88.90	97.92	2,979.8	-1,756.3	4,140.7	4,491.1	3.45	-2.00	-2.81
7,297.0	89.16	97.47	2,980.3	-1,760.3	4,170.4	4,520.4	1.73	0.87	-1.50
7,328.0	89.08	97.48	2,980.8	-1,764.3	4,201.1	4,550.7	0.26	-0.26	-0.03
7,359.0	89.52	97.43	2,981.2	-1,768.3	4,231.9	4,580.9	1.42	1.42	-0.10
7,389.0	89.60	97.43	2,981.4	-1,772.2	4,261.6	4,610.2	0.27	0.27	0.00
7,420.0	89.78	97.23	2,981.6	-1,778.2	4,292.4	4,640.5	0.87	0.58	-0.65
7,451.0	89.96	97.39	2,981.6	-1,780.1	4,323.1	4,670.7	0.78	0.58	0.52
7,481.0	89.96	97.88	2,981.6	-1,784.1	4,352.8	4,700.1	1.63	0.00	1.63
7,512.0	89.78	97.73	2,981.7	-1,788.3	4,383.5	4,730.4	0.78	-0.58	-0.48
7,542.0	89.60	97.94	2,981.9	-1,792.4	4,413.3	4,759.7	0.92	-0.80	0.70
7,573.0	90.13	98.42	2,981.9	-1,796.8	4,444.0	4,790.1	2.31	1.71	1.55
7,604.0	90.40	98.60	2,981.8	-1,801.4	4,474.6	4,820.5	1.05	0.87	0.58
7,634.0	91.01	98.61	2,981.4	-1,805.9	4,504.3	4,849.9	2.03	2.03	0.03
7,665.0	91.38	98.79	2,980.8	-1,810.6	4,534.9	4,880.3	1.27	1.13	0.58
7,696.0	90.22	98.69	2,980.4	-1,815.3	4,565.5	4,910.7	3.89	-3.68	-0.32
7,726.0	90.13	98.55	2,980.3	-1,819.8	4,595.2	4,940.1	0.55	-0.30	-0.47
7,757.0	90.13	98.67	2,980.2	-1,824.4	4,625.9	4,970.5	0.39	0.00	0.39
7,788.0	90.13	98.56	2,980.1	-1,829.1	4,656.5	5,000.9	0.35	0.00	-0.35
7,818.0	90.68	98.77	2,979.9	-1,833.8	4,686.2	5,030.4	1.90	1.77	0.70
7,849.0	91.01	99.34	2,979.5	-1,838.5	4,718.8	5,080.8	2.18	1.13	1.84



Pathfinder Survey Report

PATHFINDER
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TVD Reference: WELL @ 6148.0usft (Original Well Elev)
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North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 6000.1 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)
7,880.0	88.99	98.81	2,979.5	-1,843.3	4,747.4	5,091.3	6.74	-6.52	-1.71
7,910.0	88.48	98.07	2,980.1	-1,847.7	4,777.0	5,120.7	3.03	-1.77	-2.47
7,941.0	88.55	98.34	2,981.0	-1,852.2	4,807.7	5,151.0	0.92	0.29	0.87
7,972.0	89.08	98.82	2,981.8	-1,858.8	4,838.4	5,181.4	2.31	1.71	1.55
8,033.0	89.25	98.48	2,982.5	-1,866.0	4,898.7	5,241.2	0.62	0.28	-0.56
8,064.0	89.16	98.72	2,982.9	-1,870.6	4,929.3	5,271.8	0.83	-0.29	0.77
8,094.0	89.34	98.39	2,983.3	-1,875.1	4,959.0	5,301.1	1.25	0.60	-1.10
8,125.0	89.87	98.62	2,983.5	-1,879.8	4,989.6	5,331.4	1.88	1.71	0.74
8,156.0	90.31	98.95	2,983.5	-1,884.4	5,020.3	5,361.9	1.77	1.42	1.06
8,186.0	90.88	99.03	2,983.2	-1,889.1	5,049.9	5,391.3	1.20	1.17	0.27
8,217.0	91.10	98.75	2,982.7	-1,893.9	5,080.5	5,421.8	1.68	1.42	-0.90
8,248.0	90.66	98.65	2,982.3	-1,898.5	5,111.2	5,452.2	1.46	-1.42	-0.32
8,278.0	90.48	99.11	2,982.0	-1,903.2	5,140.8	5,481.6	1.85	-0.80	1.53
8,309.0	90.88	99.52	2,981.7	-1,908.2	5,171.4	5,512.1	1.44	0.58	1.32
8,340.0	90.48	99.00	2,981.3	-1,913.2	5,202.0	5,542.6	1.77	-0.58	-1.68
8,370.0	90.40	98.23	2,981.1	-1,917.7	5,231.7	5,572.0	2.58	-0.27	-2.57
8,401.0	91.28	97.88	2,980.7	-1,922.0	5,262.4	5,602.3	3.38	2.84	-1.84
8,432.0	91.71	97.81	2,979.9	-1,928.1	5,293.1	5,632.8	1.40	1.39	-0.18
8,462.0	90.57	97.38	2,979.3	-1,930.0	5,322.8	5,661.9	3.88	-3.80	-0.77
8,493.0	89.43	97.53	2,979.3	-1,934.0	5,353.5	5,692.2	3.71	-3.88	0.48
8,524.0	89.52	97.67	2,979.5	-1,938.1	5,384.3	5,722.5	0.54	0.29	0.45
8,554.0	89.43	97.41	2,979.8	-1,942.0	5,414.0	5,751.8	0.92	-0.30	-0.87
8,585.0	89.89	97.72	2,980.1	-1,948.1	5,444.7	5,782.1	1.31	0.84	1.00
8,618.0	89.89	97.34	2,980.2	-1,950.2	5,475.5	5,812.3	1.23	0.00	-1.23
8,648.0	90.57	97.16	2,980.2	-1,954.0	5,505.2	5,841.6	2.99	2.93	-0.60
8,677.0	91.19	97.28	2,979.7	-1,957.9	5,536.0	5,871.9	2.04	2.00	0.39
8,708.0	91.89	97.54	2,978.8	-1,961.9	5,568.7	5,902.1	2.41	2.28	0.84
8,738.0	91.10	97.50	2,978.1	-1,965.8	5,596.4	5,931.4	2.84	-2.63	-0.13
8,769.0	90.75	98.80	2,977.6	-1,970.2	5,627.1	5,961.8	4.34	-1.13	4.19
8,800.0	86.70	100.08	2,978.3	-1,975.3	5,657.7	5,992.2	13.88	-13.06	4.06
8,830.0	88.53	99.58	2,980.0	-1,980.4	5,687.2	6,021.7	1.76	-0.57	-1.67
8,861.0	87.67	100.03	2,981.8	-1,985.6	5,717.7	6,052.2	3.98	3.68	1.52
8,892.0	88.81	100.13	2,982.5	-1,991.1	5,748.2	6,082.7	3.69	3.68	0.32
8,922.0	88.55	99.83	2,983.2	-1,998.3	5,777.7	6,112.3	1.32	-0.87	-1.00
8,953.0	88.81	100.02	2,983.9	-2,001.8	5,808.3	6,142.8	1.04	0.84	0.81
8,983.0	88.99	100.18	2,984.5	-2,006.9	5,837.8	6,172.4	0.80	0.60	0.53
9,014.0	88.81	100.27	2,985.1	-2,012.4	5,868.3	6,202.9	0.65	-0.58	0.29
9,045.0	88.81	100.27	2,985.8	-2,017.9	5,898.8	6,233.5	0.00	0.00	0.00
9,075.0	89.78	100.71	2,986.1	-2,023.3	5,928.3	6,263.1	3.55	3.23	1.47
9,137.0	89.78	100.71	2,986.4	-2,034.9	5,989.2	6,324.3	0.00	0.00	0.00

Straight Line Projection to Bit Depth @ 9137' MD



Pathfinder
Survey Report

PATHFINDER
A Schlumberger Company

Company: Red Willow Production Company
Project: Archuleta Co., CO
Site: Sec21 T32N R04W
Well: North Carracas 32-4 #22D-2
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Carracas 32-4 #22D-2
TVD Reference: WELL @ 8148.0usft (Original Well Elev)
MD Reference: WELL @ 8148.0usft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
4,171.0	2,970.3	7"	7	8-3/4

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,988.0	2,965.1	-1,268.2	901.9	Coal Entry @ 3988' MD / 2965' TVD
9,137.0	2,988.4	-2,034.9	5,989.2	Straight Line Projection to Bit Depth @ 9137'MD

Checked By: _____ Approved By: _____ Date: _____