



COG OPERATING

Wildcat (Eddy County, NM)

Eddy County, NM

Poptart "12" Federal #4H

VH - Job #32K12111261

30-015-39712

Survey: Gyro

SDI Standard Survey Report

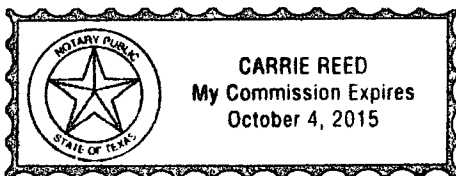
This survey is correct to the best of my knowledge and is supported by actual field data.

Fluorhart

Notarized this date 31st of December, 2011.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling
Directional Drilling Operations

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Poptart "12" Federal #4H
Project:	Wildcat (Eddy County, NM)	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Poptart "12" Federal #4H	North Reference:	Grid
Wellbore:	VH - Job #32K12111261	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12111261	Database:	EDM-Regulatory

Project:	Wildcat (Eddy County, NM)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico Central 3002		

Site:	Eddy County, NM		
Site Position:		Northing:	695,322.90 usft
From:	Lat/Long	Easting:	1,178,985.29 usft
Position Uncertainty:	0.0 usft	Slot Radius:	0"
		Latitude:	32° 53' 31.090 N
		Longitude:	104° 2' 17.570 W
		Grid Convergence:	1.20 °

Well:	Poptart "12" Federal #4H, Directional (Pathfinder)		
Well Position	+N/-S	0.0 usft	Northing: 619,764.67 usft
	+E/-W	0.0 usft	Easting: 1,244,985.32 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 40' 49.717 N
		Longitude:	103° 49' 44.433 W
		Ground Level:	0.0 usft

Wellbore:	VH - Job #32K12111261				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2010	12/30/2011	(°) 7.67	(°) 60.55	(nT) 48,835

Design:	VH - Job #32K12111261			
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	181.00

Survey Program	Date	1/22/2012			
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.0	11,027.0	Gyro (VH - Job #32K12111261)	Keeper	Keeper Gyro	

Survey								
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance	
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0	
100.0	0.40	177.92	100.0	-0.3	0.0	177.92	0.3	
200.0	0.26	151.13	200.0	-0.9	0.1	171.44	0.9	
300.0	0.29	199.66	300.0	-1.3	0.2	173.19	1.3	
400.0	0.50	189.86	400.0	-2.0	0.0	180.02	2.0	
500.0	0.35	160.28	500.0	-2.7	0.0	179.41	2.7	
600.0	0.58	205.98	600.0	-3.5	-0.1	181.50	3.5	
700.0	0.73	184.98	700.0	-4.6	-0.4	184.62	4.6	
800.0	1.00	182.32	800.0	-6.1	-0.5	184.33	6.1	
900.0	1.65	148.65	899.9	-8.2	0.3	178.21	8.2	
1,000.0	1.44	150.00	999.9	-10.5	1.6	171.14	10.6	
1,100.0	1.56	150.83	1,099.9	-12.8	2.9	167.09	13.1	

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Well:	Poptart "12" Federal #4H	North Reference:	Grid
Wellbore:	VH - Job #32K12111261	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12111261	Database:	EDM-Regulatory

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)		
1,200.0	1.15	150.24	1,199.8	-14.8	4.1	164.58	15.4		
1,300.0	1.24	145.64	1,299.8	-16.6	5.2	162.60	17.4		
1,400.0	1.04	147.81	1,399.8	-18.2	6.3	160.98	19.3		
1,500.0	0.91	131.46	1,499.8	-19.5	7.4	159.33	20.9		
1,600.0	1.13	115.84	1,599.8	-20.5	8.8	156.64	22.3		
1,700.0	1.14	93.53	1,699.8	-21.0	10.7	152.91	23.6		
1,800.0	1.70	80.95	1,799.7	-20.8	13.2	147.63	24.6		
1,900.0	1.84	77.04	1,899.7	-20.2	16.2	141.26	25.9		
2,000.0	2.20	71.34	1,999.6	-19.2	19.6	134.47	27.5		
2,100.0	2.02	79.73	2,099.5	-18.3	23.2	128.34	29.5		
2,200.0	2.10	75.29	2,199.5	-17.5	26.7	123.33	31.9		
2,300.0	1.96	74.71	2,299.4	-16.6	30.1	118.91	34.4		
2,400.0	1.96	83.15	2,399.4	-16.0	33.4	115.52	37.0		
2,500.0	1.87	87.22	2,499.3	-15.7	36.8	113.10	40.0		
2,600.0	1.67	87.83	2,599.3	-15.5	39.8	111.31	42.8		
2,700.0	1.46	92.04	2,699.2	-15.5	42.6	110.05	45.3		
2,800.0	1.40	93.46	2,799.2	-15.7	45.1	109.15	47.7		
2,900.0	1.18	97.12	2,899.2	-15.9	47.3	108.53	49.9		
3,000.0	1.14	98.81	2,999.1	-16.1	49.3	108.12	51.9		
3,100.0	0.97	111.92	3,099.1	-16.6	51.1	108.01	53.7		
3,200.0	0.92	112.15	3,199.1	-17.2	52.6	108.13	55.4		
3,300.0	0.67	114.41	3,299.1	-17.8	53.9	108.25	56.7		
3,400.0	0.55	109.13	3,399.1	-18.2	54.9	108.32	57.8		
3,500.0	0.48	101.82	3,499.1	-18.4	55.7	108.28	58.7		
3,600.0	0.48	81.11	3,599.1	-18.4	56.6	108.05	59.5		
3,700.0	0.45	83.71	3,699.1	-18.3	57.4	107.71	60.2		
3,800.0	0.43	93.10	3,799.1	-18.3	58.1	107.47	60.9		
3,900.0	0.23	113.65	3,899.1	-18.4	58.7	107.41	61.5		
4,000.0	0.03	122.26	3,999.1	-18.5	58.9	107.43	61.7		
4,100.0	0.12	296.31	4,099.1	-18.5	58.8	107.43	61.6		
4,200.0	0.17	298.39	4,199.1	-18.3	58.6	107.38	61.4		
4,300.0	0.13	303.48	4,299.1	-18.2	58.4	107.33	61.1		
4,400.0	0.04	328.53	4,399.1	-18.1	58.3	107.28	61.0		
4,500.0	0.54	346.08	4,499.1	-17.6	58.1	106.87	60.7		
4,600.0	0.83	340.59	4,599.1	-16.5	57.8	105.93	60.1		
4,700.0	1.03	346.95	4,699.1	-14.9	57.3	104.60	59.2		
4,800.0	0.74	345.94	4,799.0	-13.4	57.0	103.27	58.5		
4,900.0	0.83	336.11	4,899.0	-12.1	56.5	102.12	57.8		
5,000.0	0.66	345.40	4,999.0	-10.9	56.1	101.02	57.1		
5,100.0	1.07	331.64	5,099.0	-9.5	55.5	99.76	56.3		
5,200.0	0.91	331.24	5,199.0	-8.0	54.7	98.35	55.2		
5,300.0	0.89	334.56	5,299.0	-6.6	53.9	97.00	54.4		
5,400.0	1.06	330.28	5,399.0	-5.1	53.2	95.50	53.4		
5,500.0	1.03	318.58	5,499.0	-3.6	52.1	94.00	52.2		

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Wellbore:	VH - Job #32K12111261	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12111261	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure/Azimuth (°)	Closure Distance (usft)	
5,600.0	1.10	307.01	5,598.9	-2.4	50.7	92.70	50.8	
5,700.0	1.11	302.24	5,698.9	-1.3	49.2	91.51	49.2	
5,800.0	1.13	301.70	5,798.9	-0.3	47.5	90.32	47.5	
5,900.0	1.21	310.10	5,898.9	0.9	45.9	88.83	45.9	
6,000.0	1.38	307.48	5,998.9	2.3	44.1	86.95	44.1	
6,100.0	1.37	304.94	6,098.8	3.8	42.2	84.90	42.3	
6,200.0	1.14	313.04	6,198.8	5.1	40.4	82.77	40.8	
6,300.0	1.26	315.87	6,298.8	6.6	39.0	80.39	39.5	
6,400.0	1.23	313.20	6,398.8	8.1	37.4	77.75	38.3	
6,500.0	1.04	330.17	6,498.7	9.6	36.2	75.07	37.4	
6,600.0	0.87	331.74	6,598.7	11.1	35.4	72.58	37.1	
6,700.0	0.94	351.78	6,698.7	12.6	34.9	70.17	37.1	
6,800.0	0.78	12.86	6,798.7	14.1	34.9	68.08	37.6	
6,900.0	0.89	2.46	6,898.7	15.5	35.1	66.18	38.4	
7,000.0	1.33	15.88	6,998.7	17.4	35.5	63.88	39.5	
7,100.0	1.24	24.75	7,098.6	19.5	36.2	61.72	41.1	
7,200.0	1.73	31.10	7,198.6	21.8	37.5	59.85	43.3	
7,300.0	1.55	34.74	7,298.6	24.2	39.0	58.22	45.9	
7,400.0	1.97	35.36	7,398.5	26.7	40.8	56.80	48.7	
7,500.0	1.94	36.66	7,498.5	29.4	42.8	55.47	51.9	
7,600.0	1.88	45.10	7,598.4	32.0	44.9	54.59	55.1	
7,700.0	2.19	34.46	7,698.3	34.7	47.2	53.69	58.6	
7,800.0	2.17	26.97	7,798.3	37.9	49.1	52.32	62.1	
7,900.0	1.99	60.61	7,898.2	40.5	51.5	51.83	65.5	
8,000.0	1.41	55.64	7,998.2	42.0	54.0	52.12	68.5	
8,100.0	0.43	28.63	8,098.2	43.1	55.2	52.06	70.0	
8,200.0	0.62	44.89	8,198.2	43.8	55.8	51.88	70.9	
8,300.0	0.74	23.14	8,298.1	44.7	56.4	51.58	72.0	
8,400.0	1.00	347.78	8,398.1	46.2	56.5	50.73	73.0	
8,500.0	1.20	339.62	8,498.1	48.0	55.9	49.35	73.7	
8,600.0	1.46	343.03	8,598.1	50.2	55.2	47.70	74.6	
8,700.0	1.88	338.89	8,698.0	53.0	54.2	45.68	75.8	
8,800.0	1.97	320.79	8,798.0	55.8	52.6	43.27	76.7	
8,900.0	1.32	286.14	8,898.0	57.5	50.4	41.23	76.4	
9,000.0	1.09	287.63	8,997.9	58.1	48.4	39.77	75.6	
9,100.0	0.93	258.57	9,097.9	58.2	46.7	38.71	74.6	
9,200.0	0.86	245.43	9,197.9	57.8	45.2	38.04	73.3	
9,300.0	0.82	304.39	9,297.9	57.8	43.9	37.20	72.6	
9,400.0	1.07	292.55	9,397.9	58.6	42.5	35.92	72.4	
9,500.0	0.82	294.49	9,497.9	59.3	40.9	34.64	72.0	
9,600.0	0.97	294.14	9,597.9	59.9	39.5	33.41	71.8	
9,700.0	0.81	275.58	9,697.8	60.3	38.0	32.24	71.3	
9,800.0	0.90	290.11	9,797.8	60.7	36.6	31.11	70.8	
9,900.0	0.96	279.03	9,897.8	61.1	35.0	29.85	70.4	

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SDI Standard Survey Report



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Project:	Wildcat (Eddy County, NM)	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Poptart "12" Federal #4H	North Reference:	Grid
Wellbore:	VH - Job #32K12111261	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K12111261	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
10,000.0	1.04	293.54	9,997.8	61.6	33.4	28.47	70.0
10,100.0	1.24	311.40	10,097.8	62.6	31.7	26.87	70.2
10,200.0	1.36	322.15	10,197.8	64.3	30.2	25.16	71.0
10,300.0	1.77	339.26	10,297.7	66.7	28.9	23.45	72.7
10,400.0	1.64	344.28	10,397.7	69.5	28.0	21.94	74.9
10,500.0	1.43	355.41	10,497.6	72.1	27.5	20.87	77.2
10,600.0	1.42	357.59	10,597.6	74.6	27.3	20.13	79.4
10,700.0	1.44	358.77	10,697.6	77.1	27.3	19.48	81.8
10,800.0	1.62	7.87	10,797.5	79.7	27.4	18.98	84.3
10,900.0	2.16	10.55	10,897.5	83.0	28.0	18.63	87.6
11,000.0	2.28	12.65	10,997.4	86.8	28.8	18.33	91.4
11,027.0	2.34	9.05	11,024.4	87.9	29.0	18.24	92.5



Scientific Drilling
Directional Drilling Operations

Project: Wildcat (Eddy County, NM)
Eddy County, NM
Well: Poptart "12" Federal #4H
Wellbore: VH - Job #32K12111261
Design: VH - Job #32K12111261

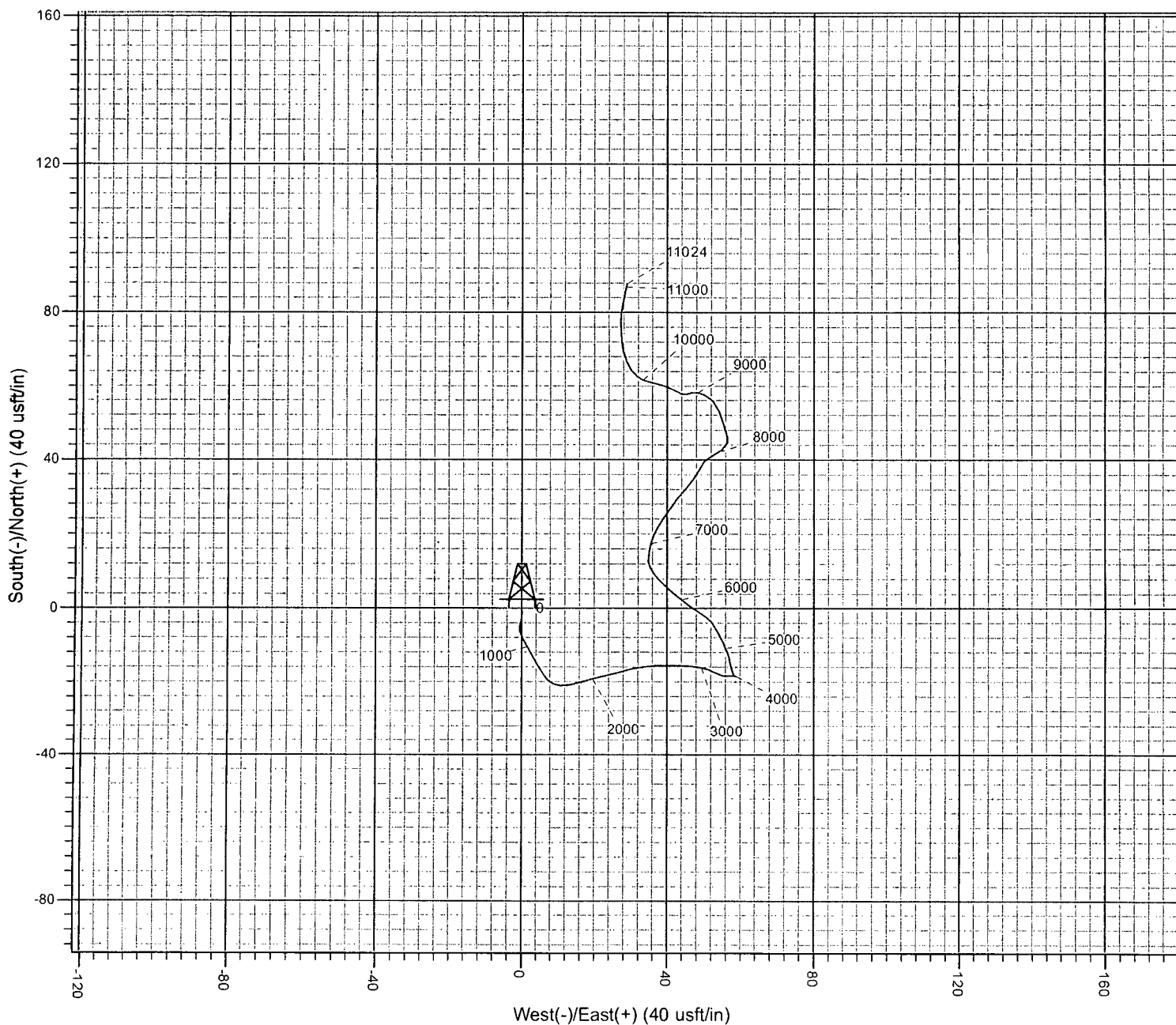


Azimuths to Grid North
True North: -1.31°
Magnetic North: 6.37°

Magnetic Field
Strength: 48834.7nT
Dip Angle: 60.55°
Date: 12/30/2011
Model: IGRF2010

WELL DETAILS: Poptart "12" Federal #4H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	619764.67	1244985.32	32° 40' 49.717 N	103° 49' 44.433 W	



PROJECT DETAILS: Wildcat (Eddy County, NM)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico Central 3002
System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM
Site Centre Latitude: 32° 53' 31.090 N
Longitude: 104° 2' 17.570 W
Positional Uncertainty: 0.0
Convergence: 1.20
Local North: Grid

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
POPTART 12 FEDERAL #4H ST2
EDDY COUNTY, NM

Rig:MCVAY 7

PathFinder Office Supervisor: STEVE BIBB

PathFinder Field Engineers: NICK POND

ALLAN ABRAHAM

CHARLIE SANDIFER

JARREN EASLEY

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.40.49.7172 N LON:103.49.44.4333 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 696507.1700 Y: 611657.4200
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.40° EAST TO GRID
Vertical Section Plane: 181.00
Survey Vert. Reference: 17.00' Kelly Bushing To Ground
Altitude:3613.90' Ground To MSL

Survey Calculations by:RX5 V6.03E using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
12.00	0.44	262.44	10.58	0.00	-55.81	53.12 N	154.48 E	163.36@	71.02	0.00
** TIED INTO SCIENTIFIC GYRO SURVEY @ 9900'MD.										
9900.00	0.96	279.03	9897.82	9888.00	-61.73	61.13 N	35.04 E	70.46@	29.82	0.01
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
9926.00	3.96	214.26	9923.80	26.00	-61.01	60.42 N	34.32 E	69.49@	29.60	14.06
9958.00	7.03	211.59	9955.65	32.00	-58.40	57.84 N	32.67 E	66.43@	29.46	9.62
9990.00	8.62	203.49	9987.35	32.00	-54.50	53.97 N	30.69 E	62.09@	29.62	6.04
10021.00	10.99	197.40	10017.89	31.00	-49.52	49.02 N	28.88 E	56.90@	30.50	8.34
10053.00	11.34	195.33	10049.29	32.00	-43.54	43.08 N	27.14 E	50.91@	32.21	1.66
10085.00	10.73	191.85	10080.70	32.00	-37.57	37.13 N	25.69 E	45.15@	34.68	2.82
10117.00	10.55	189.65	10112.15	32.00	-31.75	31.32 N	24.59 E	39.82@	38.13	1.39
10149.00	12.57	191.14	10143.50	32.00	-25.42	25.02 N	23.43 E	34.27@	43.12	6.38
10181.00	15.74	193.57	10174.52	32.00	-17.76	17.38 N	21.73 E	27.83@	51.35	10.08
10213.00	19.43	194.76	10205.02	32.00	-8.35	8.01 N	19.36 E	20.95@	67.52	11.59
10245.00	22.34	194.85	10234.91	32.00	2.73	3.02 S	16.44 E	16.72@	100.40	9.09
10277.00	24.80	195.69	10264.24	32.00	15.13	15.36 S	13.07 E	20.17@	139.61	7.76
10308.00	27.44	191.49	10292.08	31.00	28.44	28.62 S	9.89 E	30.28@	160.94	10.39
10340.00	32.01	190.47	10319.86	32.00	44.07	44.19 S	6.88 E	44.73@	171.16	14.37
10372.00	37.28	193.58	10346.18	32.00	61.91	61.97 S	3.06 E	62.04@	177.18	17.37
10404.00	42.91	195.49	10370.65	32.00	81.93	81.90 S	2.13 W	81.93@	181.49	18.01
10435.00	47.57	194.88	10392.47	31.00	103.26	103.14 S	7.89 W	103.44@	184.38	15.10
10467.00	53.02	194.06	10412.91	32.00	127.20	126.97 S	14.04 W	127.75@	186.31	17.14
10486.00	56.37	193.83	10423.88	19.00	142.31	142.02 S	17.77 W	143.13@	187.13	17.66
10518.00	62.61	193.64	10440.12	32.00	169.19	168.79 S	24.31 W	170.53@	188.20	19.51
10550.00	65.16	193.42	10454.21	32.00	197.23	196.72 S	31.03 W	199.15@	188.96	7.99
10582.00	67.18	192.41	10467.14	32.00	225.87	225.25 S	37.57 W	228.36@	189.47	6.94
10614.00	71.84	191.53	10478.33	32.00	255.29	254.57 S	43.79 W	258.31@	189.76	14.79

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
POPTART 12 FEDERAL #4H ST2
EDDY COUNTY, NM
RIG:MCVAY 7

Page 02/04

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
10677.00	76.33	191.88	10495.61	63.00	314.81	313.88 S	56.08 W	318.85@	190.13	7.15
10708.00	76.41	192.85	10502.91	31.00	344.34	343.30 S	62.53 W	348.95@	190.32	3.05
10740.00	78.79	193.11	10509.78	32.00	374.91	373.76 S	69.55 W	380.17@	190.54	7.48
10772.00	81.87	194.52	10515.16	32.00	405.67	404.38 S	77.08 W	411.67@	190.79	10.56
10803.00	85.65	195.49	10518.53	31.00	435.56	434.14 S	85.06 W	442.40@	191.08	12.58
10835.00	87.41	193.90	10520.46	32.00	466.59	465.04 S	93.16 W	474.28@	191.33	7.41
10867.00	88.90	192.85	10521.49	32.00	497.83	496.15 S	100.56 W	506.24@	191.46	5.69
10899.00	89.60	191.80	10521.91	32.00	529.21	527.41 S	107.39 W	538.23@	191.51	3.94
10931.00	90.84	190.04	10521.79	32.00	560.73	558.83 S	113.45 W	570.23@	191.48	6.73
10963.00	91.36	188.46	10521.17	32.00	592.39	590.41 S	118.59 W	602.20@	191.36	5.20
10995.00	91.98	186.35	10520.24	32.00	624.17	622.13 S	122.71 W	634.11@	191.16	6.87
11027.00	90.57	184.15	10519.53	32.00	656.07	653.98 S	125.64 W	665.94@	190.87	8.16
11059.00	88.02	181.86	10519.92	32.00	688.05	685.93 S	127.32 W	697.65@	190.52	10.71
11091.00	85.74	178.96	10521.67	32.00	719.99	717.88 S	127.55 W	729.12@	190.07	11.52
11122.00	85.91	178.72	10523.92	31.00	750.89	748.79 S	126.92 W	759.47@	189.62	0.95
11218.00	85.21	178.43	10531.35	96.00	846.51	844.47 S	124.54 W	853.60@	188.39	0.79
11313.00	84.50	169.67	10539.89	95.00	940.34	938.48 S	114.75 W	945.47@	186.97	9.21
11409.00	85.38	168.15	10548.36	96.00	1033.84	1032.32 S	96.35 W	1036.81@	185.33	1.82
11441.00	85.38	166.66	10550.93	32.00	1064.85	1063.45 S	89.40 W	1067.20@	184.81	4.64
11472.00	82.83	170.96	10554.12	31.00	1094.98	1093.69 S	83.41 W	1096.86@	184.36	16.06
11504.00	81.51	174.04	10558.48	32.00	1126.32	1125.11 S	79.27 W	1127.90@	184.03	10.39
11536.00	81.51	176.50	10563.21	32.00	1157.81	1156.65 S	76.66 W	1159.19@	183.79	7.60
11568.00	83.27	179.84	10567.44	32.00	1189.49	1188.35 S	75.65 W	1190.75@	183.64	11.72
11600.00	84.86	181.25	10570.75	32.00	1221.31	1220.17 S	75.96 W	1222.53@	183.56	6.63
11632.00	86.53	182.04	10573.15	32.00	1253.22	1252.07 S	76.87 W	1254.43@	183.51	5.77
11666.00	85.74	181.60	10575.45	34.00	1287.14	1285.97 S	77.95 W	1288.33@	183.47	2.66
11699.00	86.44	182.13	10577.70	33.00	1320.06	1318.88 S	79.02 W	1321.24@	183.43	2.66
11730.00	86.53	181.77	10579.60	31.00	1350.99	1349.80 S	80.08 W	1352.17@	183.40	1.19

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
POPTART 12 FEDERAL #4H ST2
EDDY COUNTY, NM
RIG:MCVAY 7

Page 03/04

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
11762.00	86.00	182.30	10581.68	32.00	1382.92	1381.71 S	81.21 W	1384.10@	183.36	2.34
11794.00	85.74	182.48	10583.99	32.00	1414.83	1413.60 S	82.54 W	1416.01@	183.34	0.99
11827.00	85.47	182.13	10586.52	33.00	1447.72	1446.48 S	83.86 W	1448.91@	183.32	1.34
11859.00	85.12	182.48	10589.14	32.00	1479.61	1478.35 S	85.15 W	1480.80@	183.30	1.54
11891.00	85.56	183.01	10591.74	32.00	1511.49	1510.20 S	86.67 W	1512.69@	183.28	2.15
11922.00	87.49	183.53	10593.62	31.00	1542.40	1541.09 S	88.44 W	1543.63@	183.28	6.45
11954.00	87.41	183.27	10595.04	32.00	1574.34	1573.01 S	90.33 W	1575.60@	183.29	0.85
11986.00	87.14	182.30	10596.56	32.00	1606.29	1604.93 S	91.89 W	1607.56@	183.28	3.14
12018.00	87.14	181.69	10598.16	32.00	1638.25	1636.87 S	93.00 W	1639.51@	183.25	1.90
12050.00	87.41	181.34	10599.68	32.00	1670.21	1668.82 S	93.85 W	1671.46@	183.22	1.38
12082.00	87.76	181.51	10601.03	32.00	1702.18	1700.79 S	94.64 W	1703.42@	183.18	1.22
12114.00	87.76	180.98	10602.28	32.00	1734.15	1732.75 S	95.34 W	1735.37@	183.15	1.66
12146.00	86.70	179.14	10603.83	32.00	1766.11	1764.72 S	95.37 W	1767.29@	183.09	6.63
12178.00	86.44	179.05	10605.74	32.00	1798.04	1796.65 S	94.86 W	1799.16@	183.02	0.86
12210.00	87.14	178.61	10607.53	32.00	1829.96	1828.60 S	94.21 W	1831.02@	182.95	2.58
12242.00	87.05	178.44	10609.16	32.00	1861.89	1860.54 S	93.39 W	1862.89@	182.87	0.60
12274.00	86.97	178.61	10610.83	32.00	1893.82	1892.49 S	92.57 W	1894.75@	182.80	0.59
12306.00	86.26	177.91	10612.71	32.00	1925.72	1924.42 S	91.60 W	1926.60@	182.73	3.11
12338.00	86.35	178.01	10614.78	32.00	1957.61	1956.33 S	90.46 W	1958.42@	182.65	0.42
12370.00	86.79	178.22	10616.69	32.00	1989.52	1988.26 S	89.41 W	1990.27@	182.57	1.52
12401.00	87.32	177.92	10618.28	31.00	2020.43	2019.20 S	88.37 W	2021.13@	182.51	1.96
12434.00	87.76	178.01	10619.70	33.00	2053.36	2052.15 S	87.20 W	2054.00@	182.43	1.36
12466.00	87.85	178.45	10620.93	32.00	2085.30	2084.11 S	86.21 W	2085.89@	182.37	1.40
12497.00	88.64	180.63	10621.88	31.00	2116.27	2115.09 S	85.96 W	2116.84@	182.33	7.48
12529.00	89.25	180.81	10622.46	32.00	2148.26	2147.08 S	86.36 W	2148.82@	182.30	1.99
12561.00	89.25	180.72	10622.88	32.00	2180.26	2179.08 S	86.79 W	2180.81@	182.28	0.28
12593.00	89.25	180.46	10623.30	32.00	2212.26	2211.07 S	87.12 W	2212.79@	182.26	0.81
12625.00	89.78	180.63	10623.57	32.00	2244.25	2243.07 S	87.42 W	2244.77@	182.23	1.74

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
POPTART 12 FEDERAL #4H ST2
EDDY COUNTY, NM
RIG:MCVAY 7

Page 04/04

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets		Closure Dist Dir		DLS
						(ft)	(ft)	(ft)	(deg)	(dg/100ft)
12657.00	89.96	180.46	10623.65	32.00	2276.25	2275.07 S	87.73 W	2276.76@	182.21	0.77
12689.00	90.31	180.98	10623.57	32.00	2308.25	2307.07 S	88.13 W	2308.75@	182.19	1.96
12721.00	90.22	180.02	10623.42	32.00	2340.25	2339.06 S	88.41 W	2340.73@	182.16	3.01
12753.00	90.13	180.37	10623.32	32.00	2372.25	2371.06 S	88.52 W	2372.72@	182.14	1.13
12784.00	90.84	180.28	10623.06	31.00	2403.24	2402.06 S	88.69 W	2403.70@	182.11	2.31
12816.00	91.28	180.37	10622.47	32.00	2435.24	2434.06 S	88.87 W	2435.68@	182.09	1.40
12848.00	91.89	180.63	10621.59	32.00	2467.22	2466.04 S	89.15 W	2467.65@	182.07	2.07

** The survey data at tie-in point was furnished by a recognized survey company and entered as submitted. Survey stations above the tie-in point represent recalculated data by PathFinder Energy Services, Inc. and may reflect minor changes due to rounding differences between survey programs. Only survey stations taken by qualified PathFinder personnel are subject to certification.

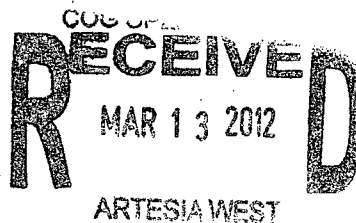
12915' MD $\pm$ 2533' S
 $\pm$ 89' W

EOL: $\pm$ 2087' FSL
 $\pm$ 621' FWL

**McVAY DRILLING COMPANY**

P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

Well Name and Num: Poptart 12 Federal 4H
Location: Sec. 12, T19S, R31E
Operator: COG
Drilling Contractor: McVay Drilling Company



The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.51	388	1.88	7330	12.57	10151	85.21	11218
0.96	745	3.43	7819	19.43	10215	84.05	11313
1.12	1244	1.40	8067	25.15	10273	85.38	11441
1.32	1744	1.09	9564	32.01	10340	82.83	11472
1.65	1904	1.02	9033	37.28	10372	81.51	11536
1.82	2190	1.52	9462	42.91	10404	86.53	11632
2.15	2349	0.79	9930	63.02	10467	86.44	11699
1.69	2508	1.50	10337	56.37	10486	86.00	11762
1.60	2991	1.67	10847	58.85	10582	85.74	11794
0.70	3471	1.58	9981	71.84	10614	85.12	11859
0.36	3948	9.41	10044	67.18	10582	87.49	11922
0.55	4428	24.45	10168	76.41	10708	87.41	11954
0.96	4904	27.35	10199	85.64	10803	87.14	12018
1.10	5387	32.01	10261	89.60	10899	87.14	12050
1.27	5868	41.06	10386	91.98	10995	87.76	12113
1.24	6349	52.67	10512	85.74	11091	87.14	12210
1.11	6830	3.96	9928	85.91	11122	87.05	12242

**McVAY DRILLING COMPANY**

P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

Well Name and Num: Poptart 12 Federal 4H
Location: Sec. 12, T19S, R31E
Operator: COG
Drilling Contractor: McVay Drilling Company

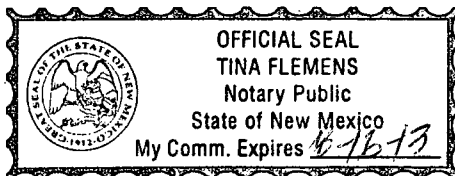
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>
87.85	12466
88.64	12497
89.25	12593
90.22	12720
90.13	12753
91.89	12848

By: Hector Cruz

Subscribed and sworn to before me this 12th day of March, 2012

Tina FLEMENS
Notary Public, Lea County, New Mexico



**McVAY DRILLING COMPANY**

P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

COG OPERATING, LLC
DEFINER

OCT 11 2012

ARTESIA WEST

Well Name and Num: Poptart 12 Fed 4H
Location: Sec. 12, T19S, R31E
Operator: COG
Drilling Contractor: McVay Drilling Company

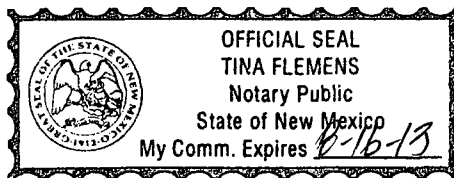
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
8.27	9850	88.20	11391	90.22	13541		
13.20	9879	87.20	11485	90.66	13636		
35.60	10086	88.11	11551	89.25	13758		
38.69	10094	90.31	11740	89.60	13853		
51.30	10166	89.96	11834				
57.30	10258	88.81	12023				
59.30	10290	87.93	12182				
60.60	10386	84.68	12307				
60.50	10417	85.91	12402				
63.70	10444	86.26	12196				
70.43	10476	87.58	12591				
85.47	10602	89.69	12686				
88.37	10790	89.30	12970				
38.20	10822	88.80	13065				
87.58	10980	89.00	13161				
87.14	11107	90.30	13350				
87.90	11201	89.60	13446				

By: Hunter Cramer

Subscribed and sworn to before me this 9th day of October, 2012

Tina Flemens
Notary Public, Lea County, New Mexico





A Schlumberger Company

COG Operating LLC

Eddy County(NAD83)

Poptart "12" Federal

#4H

ST #3

Design: ST #3

Pathfinder X&Y Report

11 October, 2012





A Schlumberger Company

Pathfinder

Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Poptart "12" Federal
Well: #4H
Wellbore: ST #3
Design: ST #3

Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
MD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project: Eddy County(NAD83)

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Eastern Zone

System Datum: Mean Sea Level

Site: Poptart "12" Federal

Site Position:		Northing:	611,657.420 usft	Latitude:	32.680477
From:	Map	Easting:	696,507.170 usft	Longitude:	-103.829009
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.27 °

Well: #4H

Well Position	+N-S	0.0 usft	Northing:	611,657.420 usft	Latitude:	32.680477
	+E-W	0.0 usft	Easting:	696,507.170 usft	Longitude:	-103.829009
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,613.9 usft

Wellbore: ST #3

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2/10/2012	7.65	60.57	48,834

Design: ST #3

Audit Notes:

Version: 1.0 **Phase:** ACTUAL **Tie On Depth:** 9,700.0

Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.0	0.0	0.0	179.55



A Schlumberger Company

Pathfinder

Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Poptart "12" Federal
Well: #4H
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Local Co-ordinate Reference: Well #4H
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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey Program		Date 10/11/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	9,700.0	Gyro #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s
9,784.0	13,923.0	Survey #1 (ST #3)	MWD	MWD - Standard

Survey												
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)		
0.0	0.00	0.00	0.0	-3,630.9	0.0	0.0	0.0	0.00	32.68	-103.83		
100.0	0.40	177.92	100.0	-3,530.9	-0.3	0.0	0.3	0.40	32.68	-103.83		
200.0	0.26	151.13	200.0	-3,430.9	-0.9	0.1	0.9	0.20	32.68	-103.83		
300.0	0.29	199.66	300.0	-3,330.9	-1.3	0.2	1.3	0.23	32.68	-103.83		
400.0	0.50	189.86	400.0	-3,230.9	-2.0	0.0	2.0	0.22	32.68	-103.83		
500.0	0.35	160.28	500.0	-3,130.9	-2.7	0.0	2.7	0.26	32.68	-103.83		
600.0	0.58	205.98	600.0	-3,030.9	-3.5	-0.1	3.5	0.42	32.68	-103.83		
700.0	0.73	184.98	700.0	-2,930.9	-4.6	-0.4	4.5	0.28	32.68	-103.83		
800.0	1.00	182.32	800.0	-2,830.9	-6.1	-0.5	6.1	0.27	32.68	-103.83		
900.0	1.65	148.65	899.9	-2,731.0	-8.2	0.3	8.2	0.99	32.68	-103.83		
1,000.0	1.44	150.00	999.9	-2,631.0	-10.5	1.6	10.5	0.21	32.68	-103.83		
1,100.0	1.56	150.83	1,099.9	-2,531.0	-12.8	2.9	12.8	0.12	32.68	-103.83		
1,200.0	1.15	150.24	1,199.8	-2,431.1	-14.8	4.1	14.8	0.41	32.68	-103.83		
1,300.0	1.24	145.64	1,299.8	-2,331.1	-16.6	5.2	16.6	0.13	32.68	-103.83		
1,400.0	1.04	147.81	1,399.8	-2,231.1	-18.2	6.3	18.3	0.20	32.68	-103.83		
1,500.0	0.91	131.46	1,499.8	-2,131.1	-19.5	7.4	19.6	0.31	32.68	-103.83		
1,600.0	1.13	115.84	1,599.8	-2,031.1	-20.5	8.8	20.6	0.35	32.68	-103.83		
1,700.0	1.14	93.53	1,699.8	-1,931.1	-21.0	10.7	21.1	0.44	32.68	-103.83		
1,800.0	1.70	80.95	1,799.7	-1,831.2	-20.8	13.2	20.9	0.64	32.68	-103.83		
1,900.0	1.84	77.04	1,899.7	-1,731.2	-20.2	16.2	20.3	0.18	32.68	-103.83		
2,000.0	2.20	71.34	1,999.6	-1,631.3	-19.2	19.6	19.4	0.41	32.68	-103.83		



A Schlumberger Company

Pathfinder Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Poptart "12" Federal
Well: #4H
Wellbore: ST #3
Design: ST #3

Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
MD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)	
2,100.0	2.02	79.73	2,099.5	-1,531.4	-18.3	23.2	18.5	0.36	32.68	-103.83	
2,200.0	2.10	75.29	2,199.5	-1,431.4	-17.5	26.7	17.7	0.18	32.68	-103.83	
2,300.0	1.96	74.71	2,299.4	-1,331.5	-16.6	30.1	16.8	0.14	32.68	-103.83	
2,400.0	1.96	83.15	2,399.4	-1,231.5	-16.0	33.4	16.2	0.29	32.68	-103.83	
2,500.0	1.87	87.22	2,499.3	-1,131.6	-15.7	36.8	16.0	0.16	32.68	-103.83	
2,600.0	1.67	87.83	2,599.3	-1,031.6	-15.5	39.8	15.9	0.20	32.68	-103.83	
2,700.0	1.46	92.04	2,699.2	-931.7	-15.5	42.6	15.9	0.24	32.68	-103.83	
2,800.0	1.40	93.46	2,799.2	-831.7	-15.7	45.1	16.0	0.07	32.68	-103.83	
2,900.0	1.18	97.12	2,899.2	-731.7	-15.9	47.3	16.2	0.23	32.68	-103.83	
3,000.0	1.14	98.81	2,999.1	-631.8	-16.1	49.3	16.5	0.05	32.68	-103.83	
3,100.0	0.97	111.92	3,099.1	-531.8	-16.6	51.1	17.0	0.29	32.68	-103.83	
3,200.0	0.92	112.15	3,199.1	-431.8	-17.2	52.6	17.6	0.05	32.68	-103.83	
3,300.0	0.67	114.41	3,299.1	-331.8	-17.8	53.9	18.2	0.25	32.68	-103.83	
3,400.0	0.55	109.13	3,399.1	-231.8	-18.2	54.9	18.6	0.13	32.68	-103.83	
3,500.0	0.48	101.82	3,499.1	-131.8	-18.4	55.7	18.8	0.10	32.68	-103.83	
3,600.0	0.48	81.11	3,599.1	-31.8	-18.4	56.6	18.9	0.17	32.68	-103.83	
3,700.0	0.45	83.71	3,699.1	68.2	-18.3	57.4	18.8	0.04	32.68	-103.83	
3,800.0	0.43	93.10	3,799.1	168.2	-18.3	58.1	18.7	0.07	32.68	-103.83	
3,900.0	0.23	113.65	3,899.1	268.2	-18.4	58.7	18.9	0.23	32.68	-103.83	
4,000.0	0.03	122.26	3,999.1	368.2	-18.5	58.9	19.0	0.20	32.68	-103.83	
4,100.0	0.12	296.31	4,099.1	468.2	-18.5	58.8	18.9	0.15	32.68	-103.83	
4,200.0	0.17	298.39	4,199.1	568.2	-18.3	58.6	18.8	0.05	32.68	-103.83	
4,300.0	0.13	303.48	4,299.1	668.2	-18.2	58.4	18.7	0.04	32.68	-103.83	
4,400.0	0.04	328.53	4,399.1	768.2	-18.1	58.3	18.6	0.10	32.68	-103.83	
4,500.0	0.54	346.08	4,499.1	868.2	-17.6	58.1	18.1	0.50	32.68	-103.83	
4,600.0	0.83	340.59	4,599.1	968.2	-16.5	57.8	16.9	0.30	32.68	-103.83	
4,700.0	1.03	346.95	4,699.1	1,068.2	-14.9	57.3	15.4	0.22	32.68	-103.83	



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Pathfinder Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Poptart "12" Federal
Well: #4H
Wellbore: ST #3
Design: ST #3

Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
MD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)	Latitude (°)	Longitude (°)	
4,800.0	0.74	345.94	4,799.0	1,168.1	-13.4	57.0	13.9	0.29	32.68	-103.83	
4,900.0	0.83	336.11	4,899.0	1,268.1	-12.1	56.5	12.6	0.16	32.68	-103.83	
5,000.0	0.66	345.40	4,999.0	1,368.1	-10.9	56.1	11.4	0.21	32.68	-103.83	
5,100.0	1.07	331.64	5,099.0	1,468.1	-9.5	55.5	10.0	0.46	32.68	-103.83	
5,200.0	0.91	331.24	5,199.0	1,568.1	-8.0	54.7	8.5	0.16	32.68	-103.83	
5,300.0	0.89	334.56	5,299.0	1,668.1	-6.6	53.9	7.0	0.06	32.68	-103.83	
5,400.0	1.06	330.28	5,399.0	1,768.1	-5.1	53.2	5.5	0.18	32.68	-103.83	
5,500.0	1.03	318.58	5,499.0	1,868.1	-3.6	52.1	4.1	0.22	32.68	-103.83	
5,600.0	1.10	307.01	5,598.9	1,968.0	-2.4	50.7	2.8	0.23	32.68	-103.83	
5,700.0	1.11	302.24	5,698.9	2,068.0	-1.3	49.2	1.7	0.09	32.68	-103.83	
5,800.0	1.13	301.70	5,798.9	2,168.0	-0.3	47.5	0.6	0.02	32.68	-103.83	
5,900.0	1.21	310.10	5,898.9	2,268.0	0.9	45.9	-0.6	0.19	32.68	-103.83	
6,000.0	1.38	307.48	5,998.9	2,368.0	2.3	44.1	-2.0	0.18	32.68	-103.83	
6,100.0	1.37	304.94	6,098.8	2,467.9	3.8	42.2	-3.4	0.06	32.68	-103.83	
6,200.0	1.14	313.04	6,198.8	2,567.9	5.1	40.4	-4.8	0.29	32.68	-103.83	
6,300.0	1.26	315.87	6,298.8	2,667.9	6.6	39.0	-6.3	0.13	32.68	-103.83	
6,400.0	1.23	313.20	6,398.8	2,767.9	8.1	37.4	-7.8	0.07	32.68	-103.83	
6,500.0	1.04	330.17	6,498.7	2,867.8	9.6	36.2	-9.4	0.38	32.68	-103.83	
6,600.0	0.87	331.74	6,598.7	2,967.8	11.1	35.4	-10.8	0.17	32.68	-103.83	
6,700.0	0.94	351.78	6,698.7	3,067.8	12.6	34.9	-12.3	0.32	32.68	-103.83	
6,800.0	0.78	12.86	6,798.7	3,167.8	14.1	34.9	-13.8	0.35	32.68	-103.83	
6,900.0	0.89	2.46	6,898.7	3,267.8	15.5	35.1	-15.2	0.19	32.68	-103.83	
7,000.0	1.33	15.88	6,998.7	3,367.8	17.4	35.5	-17.1	0.51	32.68	-103.83	
7,100.0	1.24	24.75	7,098.6	3,467.7	19.5	36.2	-19.2	0.22	32.68	-103.83	
7,200.0	1.73	31.10	7,198.6	3,567.7	21.8	37.5	-21.5	0.52	32.68	-103.83	
7,300.0	1.55	34.74	7,298.6	3,667.7	24.2	39.0	-23.9	0.21	32.68	-103.83	
7,400.0	1.97	35.36	7,398.5	3,767.6	26.7	40.8	-26.4	0.42	32.68	-103.83	



A Schlumberger Company

Pathfinder

Pathfinder X&Y Report



Company: COG Operating LLC
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Well: #4H
Wellbore: ST #3
Design: ST #3

Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
MD Reference: KB = 17 @ 3630.9usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)	
7,500.0	1.94	36.66	7,498.5	3,867.6	29.4	42.8	-29.1	0.05	32.68	-103.83	
7,600.0	1.88	45.10	7,598.4	3,967.5	32.0	44.9	-31.6	0.29	32.68	-103.83	
7,700.0	2.19	34.46	7,698.3	4,067.4	34.7	47.2	-34.3	0.49	32.68	-103.83	
7,800.0	2.17	26.97	7,798.3	4,167.4	37.9	49.1	-37.6	0.29	32.68	-103.83	
7,900.0	1.99	60.61	7,898.2	4,267.3	40.5	51.5	-40.1	1.22	32.68	-103.83	
8,000.0	1.41	55.64	7,998.2	4,367.3	42.0	54.0	-41.6	0.60	32.68	-103.83	
8,100.0	0.43	28.63	8,098.2	4,467.3	43.1	55.2	-42.6	1.05	32.68	-103.83	
8,200.0	0.62	44.89	8,198.2	4,567.3	43.8	55.8	-43.3	0.24	32.68	-103.83	
8,300.0	0.74	23.14	8,298.1	4,667.2	44.7	56.4	-44.3	0.28	32.68	-103.83	
8,400.0	1.00	347.78	8,398.1	4,767.2	46.2	56.5	-45.8	0.58	32.68	-103.83	
8,500.0	1.20	339.62	8,498.1	4,867.2	48.0	55.9	-47.6	0.25	32.68	-103.83	
8,600.0	1.46	343.03	8,598.1	4,967.2	50.2	55.2	-49.8	0.27	32.68	-103.83	
8,700.0	1.88	338.89	8,698.0	5,067.1	53.0	54.2	-52.6	0.44	32.68	-103.83	
8,800.0	1.97	320.79	8,798.0	5,167.1	55.8	52.6	-55.4	0.61	32.68	-103.83	
8,900.0	1.32	286.14	8,898.0	5,267.1	57.5	50.4	-57.1	1.16	32.68	-103.83	
9,000.0	1.09	287.63	8,997.9	5,367.0	58.1	48.4	-57.7	0.23	32.68	-103.83	
9,100.0	0.93	258.57	9,097.9	5,467.0	58.2	46.7	-57.9	0.53	32.68	-103.83	
9,200.0	0.86	245.43	9,197.9	5,567.0	57.8	45.2	-57.4	0.22	32.68	-103.83	
9,300.0	0.82	304.39	9,297.9	5,667.0	57.8	43.9	-57.5	0.83	32.68	-103.83	
9,400.0	1.07	292.55	9,397.9	5,767.0	58.6	42.5	-58.3	0.32	32.68	-103.83	
9,500.0	0.82	294.49	9,497.9	5,867.0	59.3	40.9	-58.9	0.25	32.68	-103.83	
9,600.0	0.97	294.14	9,597.9	5,967.0	59.9	39.5	-59.6	0.15	32.68	-103.83	
9,700.0	0.81	275.58	9,697.8	6,066.9	60.3	38.0	-60.0	0.33	32.68	-103.83	
9,784.0	0.88	288.00	9,781.8	6,150.9	60.6	36.8	-60.3	0.23	32.68	-103.83	
9,793.5	2.12	110.00	9,791.3	6,160.4	60.5	36.9	-60.3	31.57	32.68	-103.83	
KOP - 9793.5 'MD, 9791.3 'TVD, 60.5 'N, 36.9 'E											
9,835.0	5.89	171.37	9,832.7	6,201.8	58.2	38.0	-57.9	12.57	32.68	-103.83	

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North Reference:
Survey Calculation Method:
Database:

Well #4H
KB = 17 @ 3630.9usft (Original Well Elev)
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Grid
Minimum Curvature
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Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)	
9,850.0	8.27	173.22	9,847.6	6,216.7	56.3	38.2	-56.0	15.94	32.68	-103.83	
9,879.0	13.28	172.29	9,876.1	6,245.2	51.0	38.9	-50.7	17.29	32.68	-103.83	
9,910.0	18.64	171.66	9,905.9	6,275.0	42.5	40.1	-42.2	17.30	32.68	-103.83	
9,942.0	22.69	173.39	9,935.8	6,304.9	31.3	41.6	-31.0	12.80	32.68	-103.83	
9,973.0	25.32	175.97	9,964.1	6,333.2	18.8	42.7	-18.4	9.13	32.68	-103.83	
10,005.0	28.84	177.55	9,992.6	6,361.7	4.2	43.5	-3.9	11.23	32.68	-103.83	
10,036.0	31.13	178.28	10,019.5	6,388.6	-11.2	44.1	11.6	7.48	32.68	-103.83	
10,068.0	35.26	177.19	10,046.3	6,415.4	-28.7	44.8	29.1	13.04	32.68	-103.83	
10,099.0	38.69	175.75	10,071.0	6,440.1	-47.4	45.9	47.7	11.41	32.68	-103.83	
10,131.0	42.03	174.42	10,095.4	6,464.5	-68.0	47.7	68.4	10.78	32.68	-103.83	
10,163.0	47.22	174.43	10,118.2	6,487.3	-90.4	49.9	90.7	16.22	32.68	-103.83	
10,194.0	51.35	175.19	10,138.4	6,507.5	-113.8	52.0	114.2	13.45	32.68	-103.83	
10,226.0	54.96	176.30	10,157.6	6,526.7	-139.3	53.9	139.7	11.62	32.68	-103.83	
10,258.0	57.33	177.44	10,175.4	6,544.5	-165.8	55.4	166.2	7.98	32.68	-103.83	
10,290.0	59.36	177.46	10,192.2	6,561.3	-193.0	56.6	193.5	6.34	32.68	-103.83	
10,322.0	60.50	179.14	10,208.2	6,577.3	-220.7	57.4	221.2	5.77	32.68	-103.83	
10,354.0	60.59	180.31	10,224.0	6,593.1	-248.6	57.5	249.0	3.20	32.68	-103.83	
10,385.0	60.67	180.07	10,239.2	6,608.3	-275.6	57.4	276.0	0.72	32.68	-103.83	
10,417.0	60.50	178.60	10,254.9	6,624.0	-303.5	57.8	303.9	4.04	32.68	-103.83	
10,444.0	63.75	178.33	10,267.5	6,636.6	-327.3	58.4	327.8	12.07	32.68	-103.83	
10,476.0	70.43	179.41	10,280.0	6,649.1	-356.8	59.0	357.2	21.10	32.68	-103.83	
10,507.0	75.80	178.71	10,289.0	6,658.1	-386.4	59.5	386.9	17.46	32.68	-103.83	
10,537.6	80.84	178.41	10,295.1	6,664.2	-416.3	60.2	416.8	16.50	32.68	-103.83	
TGT #1											
10,539.0	81.07	178.40	10,295.4	6,664.5	-417.7	60.3	418.2	16.50	32.68	-103.83	
10,570.0	85.03	178.70	10,299.1	6,668.2	-448.5	61.0	449.0	12.81	32.68	-103.83	
LP - 10570.0 'MD, 10299.1 'TVD, -448.5 'N, 61.0 'E											



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Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)	Latitude (°)	Longitude (°)
10,602.0	85.47	178.73	10,301.8	6,670.9	-480.4	61.8	480.9	1.38	32.68	-103.83
10,634.0	86.09	179.43	10,304.1	6,673.2	-512.3	62.3	512.8	2.92	32.68	-103.83
10,665.0	85.82	179.79	10,306.3	6,675.4	-543.2	62.5	543.7	1.45	32.68	-103.83
10,697.0	86.17	180.89	10,308.5	6,677.6	-575.1	62.3	575.6	3.60	32.68	-103.83
10,728.0	85.82	181.32	10,310.7	6,679.8	-606.1	61.7	606.5	1.79	32.68	-103.83
10,759.0	87.23	181.44	10,312.6	6,681.7	-637.0	61.0	637.4	4.56	32.68	-103.83
10,791.0	88.37	181.64	10,313.8	6,682.9	-669.0	60.1	669.4	3.62	32.68	-103.83
10,822.0	88.20	181.32	10,314.7	6,683.8	-699.9	59.3	700.4	1.17	32.68	-103.83
10,885.0	88.37	182.13	10,316.6	6,685.7	-762.9	57.4	763.3	1.31	32.68	-103.83
10,980.0	87.58	181.84	10,320.0	6,689.1	-857.8	54.1	858.1	0.89	32.68	-103.83
11,012.0	87.41	181.82	10,321.4	6,690.5	-889.7	53.1	890.1	0.53	32.68	-103.83
11,107.0	87.14	182.22	10,325.9	6,695.0	-984.5	49.7	984.9	0.51	32.68	-103.83
11,201.0	87.93	180.30	10,329.9	6,699.0	-1,078.4	47.7	1,078.8	2.21	32.68	-103.83
11,296.0	86.97	179.95	10,334.2	6,703.3	-1,173.3	47.5	1,173.7	1.08	32.68	-103.83
11,391.0	88.20	181.07	10,338.2	6,707.3	-1,268.2	46.6	1,268.6	1.75	32.68	-103.83
11,485.0	87.23	181.29	10,341.9	6,711.0	-1,362.1	44.7	1,362.4	1.06	32.68	-103.83
11,551.0	88.11	180.81	10,344.6	6,713.7	-1,428.1	43.5	1,428.4	1.52	32.68	-103.83
11,645.0	89.87	180.87	10,346.3	6,715.4	-1,522.0	42.1	1,522.3	1.87	32.68	-103.83
11,740.0	90.31	181.34	10,346.1	6,715.2	-1,617.0	40.3	1,617.3	0.68	32.68	-103.83
11,834.0	89.96	180.92	10,345.9	6,715.0	-1,711.0	38.4	1,711.3	0.58	32.68	-103.83
11,929.0	89.34	180.55	10,346.5	6,715.6	-1,806.0	37.2	1,806.2	0.76	32.68	-103.83
12,023.0	88.81	180.61	10,348.0	6,717.1	-1,900.0	36.2	1,900.2	0.57	32.68	-103.83
12,118.0	87.93	180.46	10,350.7	6,719.8	-1,994.9	35.4	1,995.2	0.94	32.67	-103.83
12,212.0	86.88	179.99	10,354.9	6,724.0	-2,088.8	35.0	2,089.0	1.22	32.67	-103.83
12,307.0	84.68	179.14	10,361.9	6,731.0	-2,183.6	35.7	2,183.8	2.48	32.67	-103.83
12,402.0	85.91	178.54	10,369.7	6,738.8	-2,278.2	37.6	2,278.5	1.44	32.67	-103.83
12,496.0	86.26	178.28	10,376.1	6,745.2	-2,372.0	40.2	2,372.2	0.46	32.67	-103.83



A Schlumberger Company

Pathfinder Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Poptart "12" Federal
Well: #4H
Wellbore: ST #3
Design: ST #3

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well #4H
KB = 17 @ 3630.9usft (Original Well Elev)
KB = 17 @ 3630.9usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)
12,591.0	87.58	178.05	10,381.3	6,750.4	-2,466.8	43.3	2,467.1	1.41	32.67	-103.83
12,686.0	89.69	178.85	10,383.5	6,752.6	-2,561.7	45.8	2,562.0	2.38	32.67	-103.83
12,781.0	89.78	178.49	10,384.0	6,753.1	-2,656.7	48.0	2,657.0	0.39	32.67	-103.83
12,876.0	89.78	178.92	10,384.3	6,753.4	-2,751.7	50.2	2,752.0	0.45	32.67	-103.83
12,970.0	89.34	179.19	10,385.0	6,754.1	-2,845.7	51.7	2,846.0	0.55	32.67	-103.83
13,065.0	88.81	178.33	10,386.6	6,755.7	-2,940.6	53.8	2,940.9	1.06	32.67	-103.83
13,161.0	89.08	177.54	10,388.3	6,757.4	-3,036.5	57.3	3,036.9	0.87	32.67	-103.83
13,255.0	89.96	177.34	10,389.1	6,758.2	-3,130.4	61.5	3,130.8	0.96	32.67	-103.83
13,350.0	90.31	177.22	10,388.9	6,758.0	-3,225.3	66.0	3,225.7	0.39	32.67	-103.83
13,446.0	89.60	178.28	10,389.0	6,758.1	-3,321.3	69.7	3,321.7	1.33	32.67	-103.83
13,541.0	90.22	178.72	10,389.1	6,758.2	-3,416.2	72.2	3,416.7	0.80	32.67	-103.83
13,636.0	90.66	178.92	10,388.4	6,757.5	-3,511.2	74.2	3,511.7	0.51	32.67	-103.83
13,758.0	89.25	178.88	10,388.5	6,757.6	-3,633.2	76.5	3,633.7	1.16	32.67	-103.83
13,853.0	89.60	179.00	10,389.5	6,758.6	-3,728.2	78.3	3,728.6	0.39	32.67	-103.83
13,923.0	89.60	179.00	10,389.9	6,759.0	-3,798.1	79.5	3,798.6	0.00	32.67	-103.83

PROJECTED BHL - 13923.0 'MD, 10389.9 'TVD, -3798.1 'N, 79.5 'E - PBHL (PF#4H)

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,793.5	9,791.3	60.5	36.9	KOP - 9793.5 'MD, 9791.3 'TVD, 60.5 'N, 36.9 'E
10,570.0	10,299.1	-448.5	61.0	LP - 10570.0 'MD, 10299.1 'TVD, -448.5 'N, 61.0 'E
13,923.0	10,389.9	-3,798.1	79.5	PROJECTED BHL - 13923.0 'MD, 10389.9 'TVD, -3798.1 'N, 79.5 'E

Checked By: _____

Approved By: _____

Date: _____



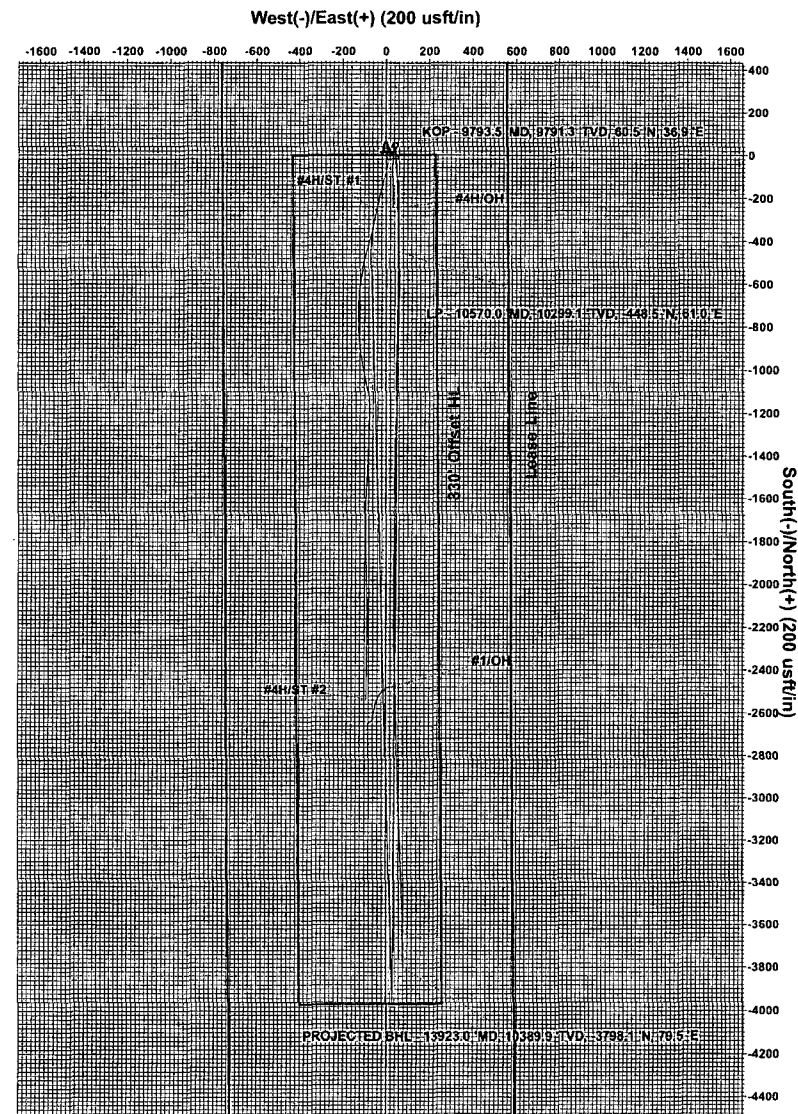
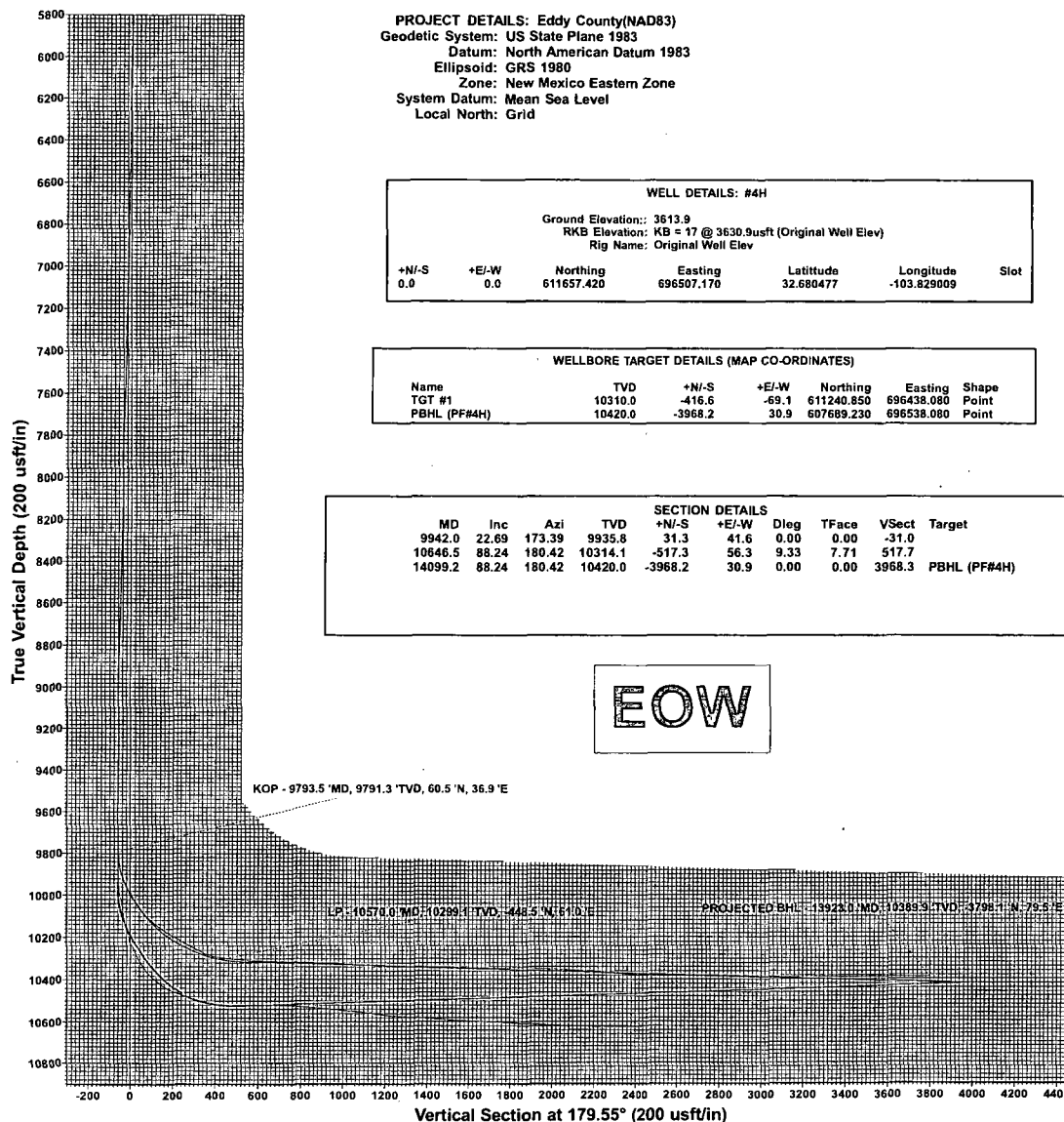
Project: Eddy County(NAD83)
 Site: Poptart "12" Federal
 Well: #4H
 Wellbore: ST #3
 Plan: Post Gyro Plan #13 (#4H/ST #3)



Azimuths to Grid North
 True North: -0.27°
 Magnetic North: 7.38°
 Magnetic Field
 Strength: 48834.2snT
 Dip Angle: 60.57°
 Date: 2/10/2012
 Model: IGRF200510



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PathFinder Energy Services, Inc.

Survey Report

COG OPERATING
POPTART 12 FED #4H
COUNTY,

Rig:

PathFinder Office Supervisor:

PathFinder Field Engineers:

Survey Horiz. Reference:WELLHEAD

Ref Coordinates: LAT:32.40.49.7172 N LON:103.49.44.4333 W

GRID Reference:NAD83 new mexico east Transverse Mercator

Ref GRID Coord: X: 696507.1700 Y: 611657.4200

North Aligned To:TRUE NORTH

Total Magnetic Correction: 7.31°EAST TO TRUE

Vertical Section Plane: 179.55

Survey Vert. Reference: 0.00' Kelly Bushing To MSL

Survey Calculations by RX5 V6.04B using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
TIE INTO SCIENTIFIC GYRO SURVEY @ 9700' MD										
9700.00	0.81	275.58	9697.84	0.00	-60.09	60.39 N	38.05 E	71.38@	32.21	0.00
THE FOLLOWING ARE INTERPOLATED SURVEYS										
9784.00	0.88	288.00	9781.83	84.00	-60.36	60.65 N	36.85 E	70.96@	31.28	0.23
9793.50	2.12	110.00	9791.33	9.50	-60.32	60.61 N	36.94 E	70.98@	31.36	31.57
THE FOLLOWING ARE PATHFINDER MWD SURVEYS										
9835.00	5.89	171.37	9832.73	41.50	-57.94	58.24 N	37.98 E	69.53@	33.11	12.57
9850.00	8.27	173.22	9847.62	15.00	-56.11	56.41 N	38.23 E	68.14@	34.12	15.94
9879.00	13.28	172.29	9876.10	29.00	-50.73	51.03 N	38.92 E	64.18@	37.33	17.29
9910.00	18.64	171.66	9905.89	31.00	-42.28	42.60 N	40.12 E	58.51@	43.28	17.30
9942.00	22.69	173.39	9935.83	32.00	-31.07	31.40 N	41.57 E	52.10@	52.93	12.80
9973.00	25.32	175.97	9964.14	31.00	-18.51	18.85 N	42.72 E	46.70@	66.20	9.13
10005.00	28.84	177.55	9992.63	32.00	-3.96	4.30 N	43.53 E	43.75@	84.35	11.23
10036.00	31.13	178.28	10019.48	31.00	11.52	11.18 S	44.09 E	45.49@	104.22	7.48
10068.00	35.26	177.19	10046.25	32.00	29.03	28.68 S	44.80 E	53.19@	122.63	13.04
10099.00	38.69	175.75	10071.02	31.00	47.64	47.28 S	45.95 E	65.94@	135.82	11.41
10131.00	42.03	174.42	10095.40	32.00	68.30	67.93 S	47.74 E	83.02@	144.90	10.78
10163.00	47.22	174.43	10118.17	32.00	90.68	90.29 S	49.92 E	103.17@	151.06	16.22
10194.00	51.35	175.19	10138.38	31.00	114.09	113.69 S	52.04 E	125.03@	155.40	13.45
10226.00	54.96	176.30	10157.57	32.00	139.64	139.22 S	53.93 E	149.30@	158.82	11.62
10258.00	57.33	177.44	10175.39	32.00	166.18	165.75 S	55.38 E	174.76@	161.52	7.98
10290.00	59.36	177.46	10192.19	32.00	193.40	192.96 S	56.59 E	201.09@	163.65	6.34
10322.00	60.50	179.14	10208.22	32.00	221.09	220.64 S	57.41 E	227.99@	165.41	5.77
10354.00	60.59	180.31	10223.96	32.00	248.95	248.50 S	57.55 E	255.08@	166.96	3.20
10386.00	60.67	180.07	10239.65	32.00	276.83	276.39 S	57.45 E	282.30@	168.26	0.70
10417.00	60.50	178.60	10254.88	31.00	303.84	303.39 S	57.77 E	308.84@	169.22	4.17

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING
POPTART 12 FED #4H
COUNTY,
RIG:

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)	Closure Dist Dir (ft) (deg)	DLS (dg/100ft)
10444.00	63.75	178.83	10267.50	27.00	327.70	327.25 S 58.30 E	332.40@ 169.90	12.06
10476.00	70.43	179.41	10279.95	32.00	357.16	356.71 S 58.75 E	361.51@ 170.65	20.94
10507.00	75.80	178.71	10288.95	31.00	386.81	386.35 S 59.24 E	390.87@ 171.28	17.46
10539.00	81.07	178.40	10295.36	32.00	418.14	417.68 S 60.03 E	421.97@ 171.82	16.50
10570.00	85.03	178.70	10299.11	31.00	448.90	448.44 S 60.81 E	452.54@ 172.28	12.81
10602.00	85.47	178.73	10301.76	32.00	480.79	480.32 S 61.52 E	484.25@ 172.70	1.38
10634.00	86.09	179.43	10304.12	32.00	512.70	512.23 S 62.04 E	515.97@ 173.09	2.92
10666.00	85.82	179.79	10306.38	32.00	544.62	544.15 S 62.25 E	547.70@ 173.47	1.40
10698.00	86.17	180.89	10308.61	32.00	576.54	576.07 S 62.06 E	579.40@ 173.85	3.60
10728.00	85.82	181.32	10310.71	30.00	606.46	605.99 S 61.49 E	609.10@ 174.21	1.85
10759.00	87.23	181.44	10312.59	31.00	637.38	636.92 S 60.74 E	639.81@ 174.55	4.57
10790.00	88.37	181.64	10313.77	31.00	668.34	667.89 S 59.91 E	670.57@ 174.87	3.73
10822.00	88.20	181.32	10314.73	32.00	700.31	699.87 S 59.08 E	702.35@ 175.17	1.13
10885.00	88.37	182.13	10316.62	63.00	763.23	762.81 S 57.19 E	764.95@ 175.71	1.31
10980.00	87.58	181.84	10319.98	95.00	858.09	857.69 S 53.90 E	859.38@ 176.40	0.89
11012.00	87.41	181.82	10321.37	32.00	890.03	889.64 S 52.88 E	891.21@ 176.60	0.53
11107.00	87.14	182.22	10325.89	95.00	984.84	984.48 S 49.53 E	985.72@ 177.12	0.51
11201.00	87.93	180.30	10329.93	94.00	1078.70	1078.36 S 47.47 E	1079.41@ 177.48	2.21
11296.00	86.97	179.95	10334.16	95.00	1173.60	1173.27 S 47.26 E	1174.22@ 177.69	1.08
11391.00	88.20	181.07	10338.16	95.00	1268.50	1268.18 S 46.42 E	1269.02@ 177.90	1.75
11485.00	87.23	181.29	10341.91	94.00	1362.39	1362.08 S 44.48 E	1362.81@ 178.13	1.06
11551.00	88.11	180.81	10344.59	66.00	1428.31	1428.01 S 43.27 E	1428.67@ 178.26	1.52
11645.00	89.87	180.87	10346.25	94.00	1522.27	1521.98 S 41.89 E	1522.56@ 178.42	1.87
11740.00	90.31	181.34	10346.10	95.00	1617.23	1616.97 S 40.06 E	1617.46@ 178.58	0.68
11834.00	89.96	180.92	10345.88	94.00	1711.19	1710.95 S 38.21 E	1711.37@ 178.72	0.58
11929.00	89.34	180.55	10346.46	95.00	1806.17	1805.94 S 36.99 E	1806.32@ 178.83	0.76
12023.00	88.81	180.61	10347.98	94.00	1900.14	1899.92 S 36.04 E	1900.26@ 178.91	0.57
12118.00	87.93	180.46	10350.68	95.00	1995.09	1994.88 S 35.15 E	1995.19@ 178.99	0.94

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING
POPTART 12 FED #4H
COUNTY,
RIG:

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
12212.00	86.88	179.99	10354.94	94.00	2088.99	2088.78 S	34.78 E	2089.07@	179.05	1.22
12307.00	84.68	179.14	10361.93	95.00	2183.72	2183.51 S	35.50 E	2183.80@	179.07	2.48
12402.00	85.91	178.54	10369.72	95.00	2278.39	2278.17 S	37.42 E	2278.48@	179.06	1.44
12496.00	86.26	178.28	10376.14	94.00	2372.15	2371.91 S	40.02 E	2372.25@	179.03	0.46
12591.00	87.58	178.05	10381.24	95.00	2466.99	2466.72 S	43.06 E	2467.10@	179.00	1.41
12686.00	89.69	178.85	10383.50	95.00	2561.94	2561.66 S	45.63 E	2562.06@	178.98	2.38
12781.00	89.78	178.49	10383.94	95.00	2656.92	2656.63 S	47.83 E	2657.06@	178.97	0.39
12876.00	89.78	178.92	10384.31	95.00	2751.91	2751.60 S	49.98 E	2752.06@	178.96	0.45
12970.00	89.34	179.19	10385.03	94.00	2845.91	2845.59 S	51.53 E	2846.06@	178.96	0.55
13065.00	88.81	178.33	10386.56	95.00	2940.88	2940.55 S	53.59 E	2941.04@	178.96	1.06
13161.00	89.08	177.54	10388.33	96.00	3036.83	3036.47 S	57.04 E	3037.01@	178.92	0.87
13255.00	89.96	177.34	10389.12	94.00	3130.76	3130.38 S	61.24 E	3130.97@	178.88	0.96
13350.00	90.31	177.22	10388.90	95.00	3225.69	3225.27 S	65.75 E	3225.94@	178.83	0.39
13446.00	89.60	178.28	10388.97	96.00	3321.64	3321.19 S	69.52 E	3321.92@	178.80	1.33
13541.00	90.22	178.72	10389.12	95.00	3416.62	3416.16 S	72.01 E	3416.92@	178.79	0.80
13636.00	90.66	178.92	10388.39	95.00	3511.61	3511.14 S	73.96 E	3511.92@	178.79	0.51
13758.00	89.25	178.88	10388.49	122.00	3633.60	3633.11 S	76.30 E	3633.91@	178.80	1.16
13853.00	89.60	179.00	10389.44	95.00	3728.59	3728.09 S	78.06 E	3728.91@	178.80	0.39
STRAIGHT LINE PROJECTION TO BIT										
13973.00	89.60	179.00	10390.28	120.00	3848.58	3848.07 S	80.16 E	3848.90@	178.81	0.00