

PATRIOT DRILLING, LLC

OPERATOR: COG Operating, LLC
WELL/LEASE: Lucky Bamboo 5 Federal # 3H
COUNTY: Eddy Co., New Mexico
Sec. 5, T26S, R26E

30-015-39914

**STATE OF NEW MEXICO
DEVIATION REPORT**

<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
357	3/4	4,528	1 1/4
587	1/4	5,029	1 1/4
880	1/4	5,509	2 3/4
1,132	1 1/4	5,573	2 1/4
1,512	3	5,780	1 3/4
1,784	1 3/4	6,066	1 1/2
2,100	3/4	6,160	1 3/4
2,574	3/4	6,265	1 3/4
3,105	1 1/2	6,350	1 3/4
3,608	1 1/4	6,447	1
4,056	1		

COG OPERATING LLC

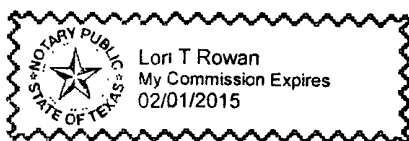
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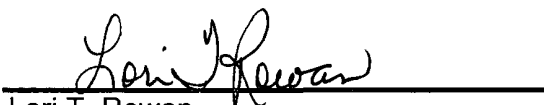
Patriot Drilling, LLC


M. Leroy Peterson, Executive Vice-
President

The foregoing instrument was acknowledged before me on this 29th day of April, 2012 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2015




Lori T. Rowan
Notary Public for Ector Co., Texas



Gyroscopic Survey Report
for
COG

Well Location	EDDY COUNTY, TEXAS
Well Name	LUCKY BAMBOO 5 FEDERAL # 3H
Rig Name	PATRIOT 2
Survey Date	4/3/2012
Latitude	32.0650000°N
North Reference	Grid North
Grid Correction	-0.01 deg
Depth Reference	RKB (17.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 358.83Azim (deg)
Definitive Survey	FINAL GYRO SURVEY
Operator(s)	FRANK RENTERIA

Well Notes



Survey:		FINAL GYRO SURVEY							
Survey Date:		4/3/2012							
MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	Closure Direction	Dogleg Severity	Closure Distance
ft	deg	deg	ft	ft	ft	ft	deg	7100ft	ft
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00
100.00	0.15	346.91	100.00	0.13	0.13	-0.03	346.91	0.15	0.13
200.00	0.34	5.01	200.00	0.55	0.55	-0.03	356.48	0.20	0.55
300.00	0.40	4.70	300.00	1.19	1.19	0.02	1.00	0.07	1.19
400.00	0.38	316.85	399.99	1.79	1.79	-0.18	354.36	0.32	1.79
500.00	0.46	302.20	499.99	2.25	2.24	-0.74	341.71	0.13	2.36
600.00	0.53	295.41	599.99	2.68	2.65	-1.50	330.56	0.09	3.04
700.00	0.39	289.75	699.99	3.01	2.96	-2.24	322.97	0.14	3.71
800.00	0.47	270.27	799.98	3.14	3.08	-2.97	316.07	0.16	4.28
900.00	0.34	273.09	899.98	3.18	3.10	-3.68	310.14	0.13	4.81
1000.00	0.34	274.52	999.98	3.23	3.14	-4.27	306.34	0.01	5.30
1100.00	0.45	108.92	1099.98	3.12	3.04	-4.19	305.93	0.78	5.17
1200.00	1.78	101.85	1199.96	2.63	2.59	-2.29	318.46	1.34	3.46
1300.00	1.49	117.73	1299.92	1.65	1.66	0.39	13.06	0.54	1.71
1400.00	2.16	110.26	1399.86	0.33	0.40	3.31	83.09	0.71	3.34
1500.00	3.14	104.48	1499.76	-1.10	-0.94	7.73	96.91	1.01	7.79
1600.00	3.11	103.51	1599.61	-2.52	-2.26	13.02	99.83	0.06	13.22
1700.00	2.00	106.09	1699.51	-3.73	-3.37	17.34	101.01	1.11	17.66
1800.00	1.49	112.32	1799.46	-4.76	-4.35	20.22	102.15	0.55	20.68
1900.00	1.36	117.70	1899.43	-5.85	-5.39	22.47	103.50	0.19	23.11
2000.00	1.11	117.14	1999.41	-6.88	-6.39	24.38	104.68	0.24	25.20
2100.00	0.85	125.60	2099.39	-7.79	-7.26	25.85	105.70	0.30	26.85
2200.00	0.82	150.45	2199.38	-8.86	-8.32	26.81	107.24	0.36	28.07
2300.00	0.66	160.48	2299.37	-10.03	-9.48	27.35	109.11	0.21	28.94
2400.00	1.01	169.83	2399.36	-11.44	-10.88	27.69	111.45	0.38	29.76
2500.00	0.99	172.61	2499.35	-13.17	-12.60	27.96	114.27	0.05	30.67
2600.00	1.13	183.40	2599.33	-15.01	-14.44	28.01	117.27	0.24	31.52
2700.00	1.05	176.77	2699.31	-16.91	-16.34	28.01	120.26	0.14	32.43
2800.00	1.07	192.93	2799.29	-18.73	-18.17	27.85	123.12	0.30	33.25
2900.00	1.16	197.93	2899.28	-20.59	-20.04	27.33	126.25	0.13	33.89
3000.00	1.12	197.60	2999.26	-22.48	-21.94	26.72	129.38	0.04	34.57
3100.00	0.98	197.96	3099.24	-24.21	-23.68	26.16	132.15	0.15	35.29
3200.00	1.01	203.24	3199.22	-25.82	-25.31	25.55	134.72	0.10	35.96
3300.00	1.05	203.44	3299.21	-27.46	-26.96	24.84	137.35	0.04	36.66
3400.00	1.06	201.42	3399.19	-29.15	-28.66	24.14	139.90	0.04	37.47
3500.00	0.98	202.35	3499.17	-30.78	-30.31	23.48	142.24	0.08	38.34
3600.00	1.04	204.91	3599.16	-32.38	-31.92	22.77	144.50	0.08	39.21
3700.00	1.01	195.77	3699.14	-34.03	-33.59	22.15	146.60	0.17	40.23
3800.00	0.96	179.37	3799.13	-35.71	-35.27	21.92	148.14	0.28	41.52
3900.00	0.92	177.46	3899.12	-37.34	-36.90	21.96	149.24	0.05	42.94



Survey:		FINAL GYRO SURVEY								
Survey Date:		4/3/2012								
MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	Closure Direction	Dogleg Severity	Closure Distance	
ft	deg	deg	ft	ft	ft	ft	deg	7100ft	ft	
4000.00	0.91	174.49	3999.10	-38.94	-38.50	22.08	150.17	0.05	44.38	
4100.00	0.94	172.36	4099.09	-40.55	-40.10	22.26	150.96	0.04	45.87	
4200.00	0.93	164.66	4199.08	-42.15	-41.70	22.59	151.56	0.13	47.42	
4300.00	0.88	158.41	4299.06	-43.66	-43.20	23.08	151.88	0.11	48.98	
4400.00	0.89	162.60	4399.05	-45.12	-44.65	23.60	152.14	0.06	50.50	
4500.00	0.95	161.86	4499.04	-46.66	-46.18	24.09	152.45	0.07	52.09	
4600.00	1.07	145.49	4599.02	-48.24	-47.74	24.88	152.48	0.31	53.84	
4700.00	1.25	134.52	4699.00	-49.81	-49.28	26.19	152.01	0.29	55.81	
4800.00	1.19	144.16	4798.98	-51.44	-50.89	27.58	151.55	0.22	57.88	
4900.00	1.26	145.06	4898.96	-53.21	-52.63	28.81	151.30	0.08	60.00	
5000.00	1.21	146.82	4998.93	-55.02	-54.42	30.02	151.12	0.06	62.15	
5100.00	1.22	146.44	5098.91	-56.81	-56.19	31.19	150.97	0.01	64.26	
5200.00	1.39	159.64	5198.89	-58.85	-58.21	32.19	151.05	0.34	66.52	
5300.00	1.59	164.65	5298.85	-61.35	-60.68	32.98	151.47	0.24	69.07	
5400.00	2.23	159.97	5398.80	-64.54	-63.86	34.02	151.95	0.66	72.35	
5500.00	2.37	157.94	5498.72	-68.31	-67.60	35.46	152.32	0.16	76.34	
5600.00	2.31	160.95	5598.63	-72.16	-71.42	36.90	152.68	0.14	80.39	
5700.00	1.94	168.52	5698.56	-75.74	-74.98	37.89	153.19	0.46	84.01	
5800.00	1.80	176.71	5798.51	-78.97	-78.20	38.32	153.90	0.30	87.09	
5900.00	1.35	182.18	5898.47	-81.72	-80.95	38.36	154.65	0.48	89.58	
6000.00	1.00	250.99	5998.46	-83.17	-82.42	37.49	155.54	1.36	90.54	
6100.00	1.59	279.72	6098.43	-83.17	-82.47	35.30	156.83	0.86	89.70	
6200.00	1.59	279.25	6198.39	-82.66	-82.01	32.56	158.35	0.01	88.24	
6300.00	1.65	283.48	6298.35	-82.04	-81.45	29.79	159.91	0.14	86.73	
6400.00	1.42	287.77	6398.32	-81.28	-80.74	27.20	161.38	0.26	85.20	
6500.00	0.63	287.18	6498.30	-80.70	-80.20	25.50	162.36	0.79	84.15	
6600.00	0.67	130.12	6598.30	-80.91	-80.41	25.42	162.46	1.27	84.33	
6700.00	1.37	139.77	6698.28	-82.23	-81.70	26.64	161.94	0.72	85.93	
6800.00	1.57	161.29	6798.25	-84.46	-83.91	27.85	161.64	0.58	88.41	
6900.00	1.54	160.61	6898.21	-87.04	-86.47	28.73	161.62	0.03	91.12	
7000.00	2.12	174.17	6998.16	-90.16	-89.57	29.37	161.85	0.72	94.27	
7100.00	2.27	173.72	7098.09	-93.97	-93.38	29.77	162.32	0.15	98.01	
7200.00	1.82	181.55	7198.02	-97.53	-96.94	29.94	162.83	0.52	101.46	
7300.00	1.14	232.24	7297.99	-99.71	-99.14	29.11	163.63	1.41	103.32	
7400.00	1.89	234.56	7397.96	-101.23	-100.70	26.98	165.00	0.75	104.25	
7500.00	2.03	231.82	7497.90	-103.23	-102.75	24.25	166.72	0.17	105.57	
7600.00	2.64	226.67	7597.82	-105.84	-105.43	21.18	168.64	0.65	107.53	
7700.00	2.72	209.89	7697.71	-109.41	-109.06	18.32	170.46	0.78	110.59	
7800.00	2.16	203.30	7797.62	-113.16	-112.85	16.40	171.73	0.62	114.03	
7900.00	1.75	195.53	7897.56	-116.33	-116.05	15.24	172.52	0.49	117.04	



Survey:		FINAL GYRO SURVEY							
Survey Date:		4/3/2012							
MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	Closure Direction	Dogleg Severity	Closure Distance
ft	deg	deg	ft	ft	ft	ft	deg	%100ft	ft
8000.00	1.62	195.64	7997.52	-119.15	-118.88	14.45	173.07	0.13	119.75
8100.00	1.77	196.14	8097.47	-121.98	-121.73	13.64	173.61	0.15	122.49
8200.00	1.87	194.75	8197.42	-125.02	-124.79	12.80	174.15	0.10	125.44
8300.00	1.92	194.00	8297.37	-128.21	-127.99	11.98	174.65	0.05	128.55
8400.00	1.84	191.43	8397.31	-131.39	-131.19	11.25	175.10	0.11	131.67
8500.00	1.99	188.06	8497.26	-134.67	-134.48	10.69	175.45	0.19	134.90
8600.00	1.76	177.33	8597.20	-137.91	-137.73	10.52	175.63	0.42	138.13
8700.00	1.75	187.57	8697.16	-140.96	-140.77	10.39	175.78	0.31	141.16
8701.00	1.65	186.95	8698.15	-140.98	-140.80	10.39	175.78	9.82	141.18



COG Operating LLC

Eddy County(NAD83)

Lucky Bamboo 5 Fed

#3H

OH

Design: OH

Pathfinder X & Y Report

27 April, 2012



A Schlumberger Company



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Lucky Bamboo 5 Fed
Well: #3H
Wellbore: OH
Design: OH

Local/Co-ordinate Reference: Well #3H
TVD Reference: KB = 17' @ 3537.3usft (Original Well Elev)
MD Reference: KB = 17' @ 3537.3usft (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	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Lucky Bamboo 5 Fed		
Site Position:		Northing:	387,833.840 usft
From: Map		Easting:	546,380.330 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32.066
		Longitude:	-104.317
		Grid Convergence:	0.01 °

Well		#3H				
Well Position	+N/-S	0.0 usft	Northing:	387,833.840 usft	Latitude:	32.066
	+E/-W	0.0 usft	Easting:	546,380.330 usft	Longitude:	-104.317
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,520.3 usft	

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF200510	3/22/2012	7.81	59.92	48,401

Design	OH			
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	358.83



Pathfinder Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Lucky Bamboo 5 Fed
Well: #3H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #3H
TVD Reference: KB = 17' @ 3537.3usft (Original Well Elev)
MD Reference: KB = 17' @ 3537.3usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey Program		Date 4/27/2012			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	8,701.0	Gyro #2 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
8,755.0	13,127.0	MWD #3 (OH)	MWD	MWD - Standard	

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
0.0	0.00	0.00	0.0	-3,537.3	0.0	0.0	0.0	0.00	387,833.84	546,380.33
100.0	0.15	346.91	100.0	-3,437.3	0.1	0.0	0.1	0.15	387,833.97	546,380.30
200.0	0.34	5.01	200.0	-3,337.3	0.6	0.0	0.6	0.20	387,834.39	546,380.30
300.0	0.40	4.70	300.0	-3,237.3	1.2	0.0	1.2	0.06	387,835.03	546,380.35
400.0	0.38	316.85	400.0	-3,137.3	1.8	-0.2	1.8	0.32	387,835.62	546,380.15
500.0	0.46	302.20	500.0	-3,037.3	2.2	-0.7	2.3	0.13	387,836.08	546,379.59
600.0	0.53	295.41	600.0	-2,937.3	2.7	-1.5	2.7	0.09	387,836.49	546,378.83
700.0	0.39	289.75	700.0	-2,837.3	3.0	-2.2	3.0	0.15	387,836.81	546,378.09
800.0	0.47	270.27	800.0	-2,737.3	3.1	-3.0	3.1	0.17	387,836.92	546,377.36
900.0	0.34	273.09	900.0	-2,637.3	3.1	-3.7	3.2	0.13	387,836.94	546,376.65
1,000.0	0.34	274.52	1,000.0	-2,537.3	3.1	-4.3	3.2	0.01	387,836.98	546,376.06
1,100.0	0.45	108.92	1,100.0	-2,437.3	3.0	-4.2	3.1	0.78	387,836.88	546,376.14
1,200.0	1.78	101.85	1,200.0	-2,337.3	2.6	-2.3	2.6	1.33	387,836.43	546,378.03
1,300.0	1.49	117.73	1,299.9	-2,237.4	1.7	0.4	1.7	0.54	387,835.51	546,380.70
1,400.0	2.16	110.26	1,399.9	-2,137.4	0.4	3.3	0.3	0.71	387,834.25	546,383.62
1,500.0	3.14	104.48	1,499.8	-2,037.5	-0.9	7.7	-1.1	1.01	387,832.91	546,388.04
1,600.0	3.11	103.51	1,599.6	-1,937.7	-2.2	13.0	-2.5	0.06	387,831.59	546,393.33
1,700.0	2.00	106.09	1,699.5	-1,837.8	-3.4	17.3	-3.7	1.12	387,830.47	546,397.64
1,800.0	1.49	112.32	1,799.5	-1,737.8	-4.3	20.2	-4.8	0.54	387,829.50	546,400.52
1,900.0	1.36	117.70	1,899.4	-1,637.9	-5.4	22.4	-5.8	0.19	387,828.45	546,402.78
2,000.0	1.11	117.14	1,999.4	-1,537.9	-6.4	24.4	-6.9	0.25	387,827.46	546,404.69



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Lucky Bamboo 5 Fed
Well: #3H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #3H
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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)	Northing (usft)	Easting (usft)
2,100.0	0.85	125.60	2,099.4	-1,437.9	-7.3	25.8	-7.8	0.30	387,826.58	546,406.15
2,200.0	0.82	150.45	2,199.4	-1,337.9	-8.3	26.8	-8.9	0.36	387,825.53	546,407.11
2,300.0	0.66	160.48	2,299.4	-1,237.9	-9.5	27.3	-10.0	0.21	387,824.37	546,407.65
2,400.0	1.01	169.83	2,399.4	-1,137.9	-10.9	27.7	-11.4	0.37	387,822.95	546,408.00
2,500.0	0.99	172.61	2,499.3	-1,038.0	-12.6	27.9	-13.2	0.05	387,821.23	546,408.27
2,600.0	1.13	183.40	2,599.3	-938.0	-14.5	28.0	-15.0	0.24	387,819.39	546,408.32
2,700.0	1.05	176.77	2,699.3	-838.0	-16.3	28.0	-16.9	0.15	387,817.49	546,408.31
2,800.0	1.07	192.93	2,799.3	-738.0	-18.2	27.8	-18.7	0.30	387,815.67	546,408.16
2,900.0	1.16	197.93	2,899.3	-638.0	-20.0	27.3	-20.6	0.13	387,813.79	546,407.64
3,000.0	1.12	197.60	2,999.3	-538.0	-21.9	26.7	-22.5	0.04	387,811.90	546,407.03
3,100.0	0.98	197.96	3,099.2	-438.1	-23.7	26.1	-24.2	0.14	387,810.15	546,406.47
3,200.0	1.01	203.24	3,199.2	-338.1	-25.3	25.5	-25.8	0.10	387,808.53	546,405.86
3,300.0	1.05	203.44	3,299.2	-238.1	-27.0	24.8	-27.5	0.04	387,806.88	546,405.15
3,400.0	1.06	201.42	3,399.2	-138.1	-28.7	24.1	-29.1	0.04	387,805.18	546,404.44
3,500.0	0.98	202.35	3,499.2	-38.1	-30.3	23.5	-30.8	0.08	387,803.53	546,403.78
3,600.0	1.04	204.91	3,599.2	61.9	-31.9	22.7	-32.4	0.08	387,801.91	546,403.07
3,700.0	1.01	195.77	3,699.1	161.8	-33.6	22.1	-34.0	0.17	387,800.24	546,402.45
3,800.0	0.96	179.37	3,799.1	261.8	-35.3	21.9	-35.7	0.29	387,798.55	546,402.22
3,900.0	0.92	177.46	3,899.1	361.8	-36.9	21.9	-37.4	0.05	387,796.91	546,402.27
4,000.0	0.91	174.49	3,999.1	461.8	-38.5	22.0	-39.0	0.05	387,795.32	546,402.38
4,100.0	0.94	172.36	4,099.1	561.8	-40.1	22.2	-40.6	0.05	387,793.72	546,402.56
4,200.0	0.93	164.66	4,199.1	661.8	-41.7	22.6	-42.2	0.13	387,792.12	546,402.89
4,300.0	0.88	158.41	4,299.1	761.8	-43.2	23.1	-43.7	0.11	387,790.63	546,403.39
4,400.0	0.89	162.60	4,399.1	861.8	-44.7	23.6	-45.1	0.07	387,789.17	546,403.90
4,500.0	0.95	161.86	4,499.0	961.7	-46.2	24.1	-46.7	0.06	387,787.64	546,404.39
4,600.0	1.07	145.49	4,599.0	1,061.7	-47.8	24.8	-48.3	0.31	387,786.09	546,405.18
4,700.0	1.25	134.52	4,699.0	1,161.7	-49.3	26.2	-49.8	0.29	387,784.55	546,406.48



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Lucky Bamboo 5 Fed
Well: #3H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #3H
TVD Reference: KB = 17' @ 3537.3usft (Original Well Elev)
MD Reference: KB = 17' @ 3537.3usft (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)	Northing (usft)	Easting (usft)
4,800.0	1 19	144.16	4,799.0	1,261.7	-50.9	27.5	-51.4	0.21	387,782.94	546,407.87
4,900.0	1 26	145.06	4,899.0	1,361.7	-52.6	28.8	-53.2	0.07	387,781.20	546,409.11
5,000.0	1.21	146.82	4,998.9	1,461.6	-54.4	30.0	-55.0	0.06	387,779.42	546,410.31
5,100.0	1.22	146.44	5,098.9	1,561.6	-56.2	31.2	-56.8	0.01	387,777.65	546,411.48
5,200.0	1.39	159.64	5,198.9	1,661.6	-58.2	32.2	-58.9	0.34	387,775.62	546,412.49
5,300.0	1.59	164.65	5,298.9	1,761.6	-60.7	33.0	-61.4	0.24	387,773.15	546,413.28
5,400.0	2.23	159.97	5,398.8	1,861.5	-63.9	34.0	-64.5	0.66	387,769.98	546,414.31
5,500.0	2 37	157.94	5,498.7	1,961.4	-67.6	35.4	-68.3	0.16	387,766.24	546,415.76
5,600.0	2 31	160.95	5,598.6	2,061.3	-71.4	36.9	-72.2	0.14	387,762.42	546,417.19
5,700.0	1.94	168.52	5,698.6	2,161.3	-75.0	37.9	-75.7	0.46	387,758.85	546,418.19
5,800.0	1.80	176.71	5,798.5	2,261.2	-78.2	38.3	-79.0	0.30	387,755.62	546,418.61
5,900.0	1.35	182.18	5,898.5	2,361.2	-81.0	38.3	-81.7	0.47	387,752.88	546,418.66
6,000.0	1.00	250.99	5,998.5	2,461.2	-82.4	37.5	-83.2	1.36	387,751.42	546,417.79
6,100.0	1.59	279.72	6,098.4	2,561.1	-82.5	35.3	-83.2	0.86	387,751.37	546,415.60
6,200.0	1 59	279.25	6,198.4	2,661.1	-82.0	32.5	-82.7	0.01	387,751.83	546,412.86
6,300.0	1 65	283.48	6,298.4	2,761.1	-81.5	29.8	-82.0	0.13	387,752.38	546,410.09
6,400.0	1.42	287.77	6,398.3	2,861.0	-80.7	27.2	-81.3	0.26	387,753.10	546,407.51
6,500.0	0 63	287.18	6,498.3	2,961.0	-80.2	25.5	-80.7	0.79	387,753.64	546,405.81
6,600.0	0.67	130.12	6,598.3	3,061.0	-80.4	25.4	-80.9	1.27	387,753.42	546,405.73
6,700.0	1.37	139.77	6,698.3	3,161.0	-81.7	26.6	-82.2	0.72	387,752.13	546,406.95
6,800.0	1.57	161.29	6,798.2	3,260.9	-83.9	27.8	-84.5	0.58	387,749.92	546,408.16
6,900.0	1 54	160.61	6,898.2	3,360.9	-86.5	28.7	-87.0	0.04	387,747.36	546,409.04
7,000.0	2 12	174.17	6,998.2	3,460.9	-89.6	29.3	-90.2	0.72	387,744.25	546,409.68
7,100.0	2 27	173.72	7,098.1	3,560.8	-93.4	29.8	-94.0	0.15	387,740.44	546,410.08
7,200.0	1 82	181.55	7,198.0	3,660.7	-97.0	29.9	-97.5	0.53	387,736.89	546,410.26
7,300.0	1.14	232.24	7,298.0	3,760.7	-99.1	29.1	-99.7	1.41	387,734.69	546,409.43
7,400.0	1.89	234.56	7,398.0	3,860.7	-100.7	27.0	-101.2	0.75	387,733.13	546,407.30



Pathfinder
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Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #3H
TVD Reference: KB = 17' @ 3537.3usft (Original Well Elev)
MD Reference: KB = 17' @ 3537 3usft (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)	Northing (usft)	Easting (usft)
7,500.0	2.03	231.82	7,497.9	3,960.6	-102.8	24.2	-103.2	0.17	387,731.07	546,404.56
7,600.0	2.64	226.67	7,597.8	4,060.5	-105.4	21.2	-105.8	0.64	387,728.40	546,401.49
7,700.0	2.72	209.89	7,697.7	4,160.4	-109.1	18.3	-109.4	0.79	387,724.76	546,398.64
7,800.0	2.16	203.30	7,797.6	4,260.3	-112.9	16.4	-113.2	0.63	387,720.97	546,396.71
7,900.0	1.75	195.53	7,897.6	4,360.3	-116.1	15.2	-116.4	0.49	387,717.77	546,395.55
8,000.0	1.62	195.64	7,997.5	4,460.2	-118.9	14.4	-119.2	0.13	387,714.94	546,394.76
8,100.0	1.77	196.14	8,097.5	4,560.2	-121.7	13.6	-122.0	0.15	387,712.09	546,393.95
8,200.0	1.87	194.75	8,197.4	4,660.1	-124.8	12.8	-125.0	0.11	387,709.03	546,393.11
8,300.0	1.92	194.00	8,297.4	4,760.1	-128.0	12.0	-128.2	0.06	387,705.83	546,392.29
8,400.0	1.84	191.43	8,397.3	4,860.0	-131.2	11.2	-131.4	0.12	387,702.63	546,391.56
8,500.0	1.99	188.06	8,497.3	4,960.0	-134.5	10.7	-134.7	0.19	387,699.34	546,391.00
8,600.0	1.76	177.33	8,597.2	5,059.9	-137.8	10.5	-137.9	0.42	387,696.08	546,390.83
8,700.0	1.75	187.57	8,697.2	5,159.9	-140.8	10.4	-141.0	0.31	387,693.04	546,390.70
8,701.0	1.65	186.95	8,698.2	5,160.9	-140.8	10.4	-141.0	10.17	387,693.01	546,390.70
8,784.0	1.58	192.03	8,781.1	5,243.8	-143.1	10.0	-143.3	0.19	387,690.70	546,390.31
8,815.0	1.58	341.58	8,812.1	5,274.8	-143.1	9.8	-143.3	9.84	387,690.69	546,390.09
8,847.0	6.42	348.43	8,844.0	5,306.7	-141.0	9.3	-141.1	15.17	387,692.86	546,389.59
KOP - 8847.0 'MD, 8844.0 'TVD, 348.43 'AZI, 6.42 'INC, -141.2 'N, 9.2 'E										
8,878.0	11.17	350.33	8,874.7	5,337.4	-136.3	8.4	-136.5	15.35	387,697.52	546,388.74
8,910.0	16.36	351.01	8,905.7	5,368.4	-128.8	7.2	-128.9	16.23	387,705.04	546,387.51
8,942.0	20.84	351.97	8,936.1	5,398.8	-118.7	5.7	-118.8	14.03	387,715.13	546,386.01
8,974.0	25.06	353.41	8,965.5	5,428.2	-106.3	4.1	-106.4	13.30	387,727.50	546,384.44
9,006.0	28.93	355.93	8,994.0	5,456.7	-91.9	2.8	-91.9	12.61	387,741.96	546,383.11
9,037.0	32.71	356.96	9,020.6	5,483.3	-76.0	1.8	-76.1	12.31	387,757.81	546,382.13
9,068.0	36.32	356.69	9,046.2	5,508.9	-58.5	0.8	-58.5	11.66	387,775.35	546,381.16
9,101.0	39.39	355.18	9,072.2	5,534.9	-38.3	-0.6	-38.3	9.72	387,795.54	546,379.72
9,133.0	43.00	354.48	9,096.3	5,559.0	-17.3	-2.5	-17.3	11.37	387,816.53	546,377.81



Pathfinder
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Design: OH

Local Co-ordinate Reference: Well #3H
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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)	Northing (usft)	Easting (usft)
9,165.0	47.13	354.33	9,118.9	5,581.6	5.2	-4.7	5.3	12.91	387,839.07	546,375.60
9,196.0	51.53	353.59	9,139.1	5,601.8	28.6	-7.2	28.7	14.31	387,862.44	546,373.12
9,228.0	55.75	353.25	9,158.1	5,620.8	54.2	-10.2	54.4	13.22	387,888.04	546,370.17
9,259.0	59.27	352.73	9,174.7	5,637.4	80.1	-13.4	80.4	11.44	387,913.99	546,366.98
9,290.0	62.52	351.52	9,189.8	5,652.5	107.0	-17.1	107.3	11.02	387,940.81	546,363.26
9,322.0	65.51	350.96	9,203.8	5,666.5	135.4	-21.4	135.8	9.48	387,969.24	546,358.88
9,354.0	68.50	350.82	9,216.3	5,679.0	164.5	-26.1	165.0	9.35	387,998.32	546,354.22
9,385.0	72.11	350.93	9,226.8	5,689.5	193.3	-30.7	193.9	11.65	388,027.13	546,349.59
9,481.0	76.41	355.43	9,252.8	5,715.5	285.0	-41.7	285.8	6.36	388,118.83	546,338.66
9,513.0	76.41	359.57	9,260.3	5,723.0	316.1	-43.0	316.9	12.58	388,149.90	546,337.30
9,545.0	79.49	0.15	9,267.0	5,729.7	347.4	-43.1	348.2	9.79	388,181.19	546,337.23
9,577.0	83.10	358.47	9,271.9	5,734.6	379.0	-43.5	379.8	12.42	388,212.81	546,336.85
9,608.0	89.16	357.83	9,273.9	5,736.6	409.9	-44.5	410.7	19.66	388,243.71	546,335.85
9,640.0	91.28	356.36	9,273.8	5,736.5	441.8	-46.1	442.7	8.06	388,275.67	546,334.23
9,672.0	87.85	353.28	9,274.1	5,736.8	473.7	-49.0	474.6	14.40	388,307.53	546,331.34
9,767.0	87.58	352.87	9,277.9	5,740.6	567.9	-60.4	569.0	0.52	388,401.76	546,319.89
9,862.0	86.53	353.53	9,282.7	5,745.4	662.1	-71.7	663.4	1.30	388,495.97	546,308.66
9,957.0	89.25	352.34	9,286.2	5,748.9	756.3	-83.3	757.9	3.12	388,590.17	546,296.98
LP - 9957.0 'MD, 9286.2 'TVD, 352.34 'AZI, 89.25 'INC, 756.1 'N, -83.4 'E										
10,021.0	88.64	351.40	9,287.4	5,750.1	819.7	-92.4	821.4	1.75	388,653.51	546,287.93
10,085.0	88.64	352.69	9,288.9	5,751.6	883.0	-101.3	884.9	2.02	388,716.88	546,279.08
10,148.0	90.04	354.25	9,289.7	5,752.4	945.6	-108.4	947.6	3.33	388,779.46	546,271.92
10,211.0	89.34	354.38	9,290.0	5,752.7	1,008.3	-114.7	1,010.4	1.13	388,842.15	546,265.67
10,275.0	87.32	353.40	9,291.9	5,754.6	1,071.9	-121.5	1,074.2	3.51	388,905.76	546,258.87
10,339.0	90.84	357.30	9,292.9	5,755.6	1,135.7	-126.6	1,138.0	8.21	388,969.52	546,253.68
10,403.0	91.71	358.92	9,291.5	5,754.2	1,199.6	-128.8	1,202.0	2.87	389,033.46	546,251.57
10,466.0	88.99	0.15	9,291.1	5,753.8	1,262.6	-129.3	1,265.0	4.74	389,096.45	546,251.06



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North Reference: Grd
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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)	Northing (usft)	Easting (usft)
10,530.0	87.49	0.05	9,293.0	5,755.7	1,326.6	-129.2	1,328.9	2.35	389,160.42	546,251.17
10,593.0	90.22	1.99	9,294.3	5,757.0	1,389.5	-128.0	1,391.9	5.32	389,223.39	546,252.29
10,657.0	91.10	3.03	9,293.6	5,756.3	1,453.5	-125.2	1,455.7	2.13	389,287.32	546,255.10
10,721.0	90.04	1.09	9,292.9	5,755.6	1,517.4	-122.9	1,519.6	3.45	389,351.27	546,257.40
10,783.0	89.52	0.26	9,293.2	5,755.9	1,579.4	-122.2	1,581.6	1.58	389,413.27	546,258.13
10,847.0	87.41	1.13	9,294.9	5,757.6	1,643.4	-121.4	1,645.5	3.57	389,477.24	546,258.90
10,910.0	91.19	3.32	9,295.6	5,758.3	1,706.3	-119.0	1,708.4	6.93	389,540.17	546,261.35
10,972.0	91.01	3.49	9,294.5	5,757.2	1,768.2	-115.3	1,770.2	0.40	389,602.05	546,265.03
11,036.0	90.13	3.17	9,293.8	5,756.5	1,832.1	-111.6	1,834.0	1.46	389,665.94	546,268.75
11,100.0	87.67	2.53	9,295.1	5,757.8	1,896.0	-108.4	1,897.8	3.97	389,729.84	546,271.93
11,163.0	88.46	2.65	9,297.2	5,759.9	1,958.9	-105.6	1,960.6	1.27	389,792.74	546,274.77
11,227.0	89.60	3.32	9,298.3	5,761.0	2,022.8	-102.2	2,024.5	2.07	389,856.64	546,278.11
11,291.0	89.60	3.28	9,298.7	5,761.4	2,086.7	-98.5	2,088.3	0.06	389,920.53	546,281.79
11,355.0	89.25	3.69	9,299.4	5,762.1	2,150.6	-94.7	2,152.1	0.84	389,984.41	546,285.68
11,418.0	89.69	2.43	9,299.9	5,762.6	2,213.5	-91.3	2,214.9	2.12	390,047.32	546,289.04
11,482.0	88.64	1.89	9,300.9	5,763.6	2,277.4	-88.9	2,278.8	1.84	390,111.26	546,291.45
11,545.0	87.49	2.01	9,303.0	5,765.7	2,340.4	-86.7	2,341.6	1.84	390,174.19	546,293.60
11,609.0	88.11	2.26	9,305.4	5,768.1	2,404.3	-84.4	2,405.5	1.04	390,238.10	546,295.98
11,672.0	87.67	1.34	9,307.8	5,770.5	2,467.2	-82.4	2,468.3	1.62	390,301.02	546,297.96
11,736.0	87.23	1.04	9,310.6	5,773.3	2,531.1	-81.0	2,532.2	0.83	390,364.95	546,299.28
11,831.0	87.93	3.48	9,314.6	5,777.3	2,625.9	-77.3	2,627.0	2.67	390,459.78	546,303.03
11,895.0	87.93	2.82	9,316.9	5,779.6	2,689.8	-73.8	2,690.7	1.03	390,523.64	546,306.54
11,958.0	88.02	2.50	9,319.2	5,781.9	2,752.7	-70.9	2,753.6	0.53	390,586.53	546,309.46
12,022.0	87.76	0.96	9,321.5	5,784.2	2,816.6	-68.9	2,817.4	2.44	390,650.46	546,311.40
12,086.0	89.08	1.68	9,323.3	5,786.0	2,880.6	-67.5	2,881.4	2.35	390,714.42	546,312.87
12,149.0	88.37	0.33	9,324.7	5,787.4	2,943.5	-66.4	2,944.3	2.42	390,777.39	546,313.97
12,212.0	88.29	359.72	9,326.5	5,789.2	3,006.5	-66.3	3,007.2	0.98	390,840.36	546,314.00



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Lucky Bamboo 5 Fed
Well: #3H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #3H
TVD Reference: KB = 17' @ 3537.3usft (Original Well Elev)
MD Reference: KB = 17' @ 3537.3usft (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)	Northing (usft)	Easting (usft)
12,276.0	88.46	359.58	9,328.3	5,791.0	3,070.5	-66.7	3,071.2	0.34	390,904.34	546,313.61
12,339.0	88.29	359.21	9,330.1	5,792.8	3,133.5	-67.4	3,134.2	0.65	390,967.31	546,312.95
12,403.0	87.32	357.53	9,332.6	5,795.3	3,197.4	-69.2	3,198.1	3.03	391,031.23	546,311.13
12,467.0	88.90	358.79	9,334.7	5,797.4	3,261.3	-71.3	3,262.1	3.16	391,095.16	546,309.07
12,530.0	87.58	358.28	9,336.6	5,799.3	3,324.3	-72.9	3,325.1	2.25	391,158.11	546,307.46
12,625.0	88.46	358.97	9,339.9	5,802.6	3,419.2	-75.1	3,420.0	1.18	391,253.02	546,305.19
12,688.0	88.55	358.89	9,341.6	5,804.3	3,482.1	-76.3	3,483.0	0.19	391,315.99	546,304.01
12,752.0	90.92	359.38	9,341.8	5,804.5	3,546.1	-77.3	3,547.0	3.78	391,379.98	546,303.04
12,815.0	91.19	359.13	9,340.7	5,803.4	3,609.1	-78.1	3,610.0	0.58	391,442.96	546,302.22
12,879.0	91.54	359.42	9,339.2	5,801.9	3,673.1	-78.9	3,673.9	0.71	391,506.94	546,301.41
12,942.0	89.69	357.05	9,338.5	5,801.2	3,736.1	-80.9	3,736.9	4.77	391,569.90	546,299.47
13,006.0	89.96	356.97	9,338.7	5,801.4	3,800.0	-84.2	3,800.9	0.44	391,633.81	546,296.14
13,127.0	89.96	356.97	9,338.8	5,801.5	3,920.8	-90.6	3,921.8	0.00	391,754.64	546,289.74

BHL - 13127.0 'MD, 9338.8 'TVD, 356.97 'AZI, 89.96 'INC, 3920.6 'N, -90.7 'E

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,847.0	8,844.0	-141.0	9.3	KOP - 8847.0 'MD, 8844.0 'TVD, 348.43 'AZI, 6.42 'INC, -141.2 'N, 9.2 'E
9,957.0	9,286.2	756.3	-83.3	LP - 9957.0 'MD, 9286.2 'TVD, 352.34 'AZI, 89.25 'INC, 756.1 'N, -83.4 'E
13,127.0	9,338.8	3,920.8	-90.6	BHL - 13127.0 'MD, 9338.8 'TVD, 356.97 'AZI, 89.96 'INC, 3920.6 'N, -90.7 'E

Checked By: _____

Approved By: _____

Date: _____



Project: Eddy County(NAC)
Site: Lucky Bamboo 5
Well: #3H
Wellbore: OH
Plan: Post Gyro Plan #4 (#3H/OH)

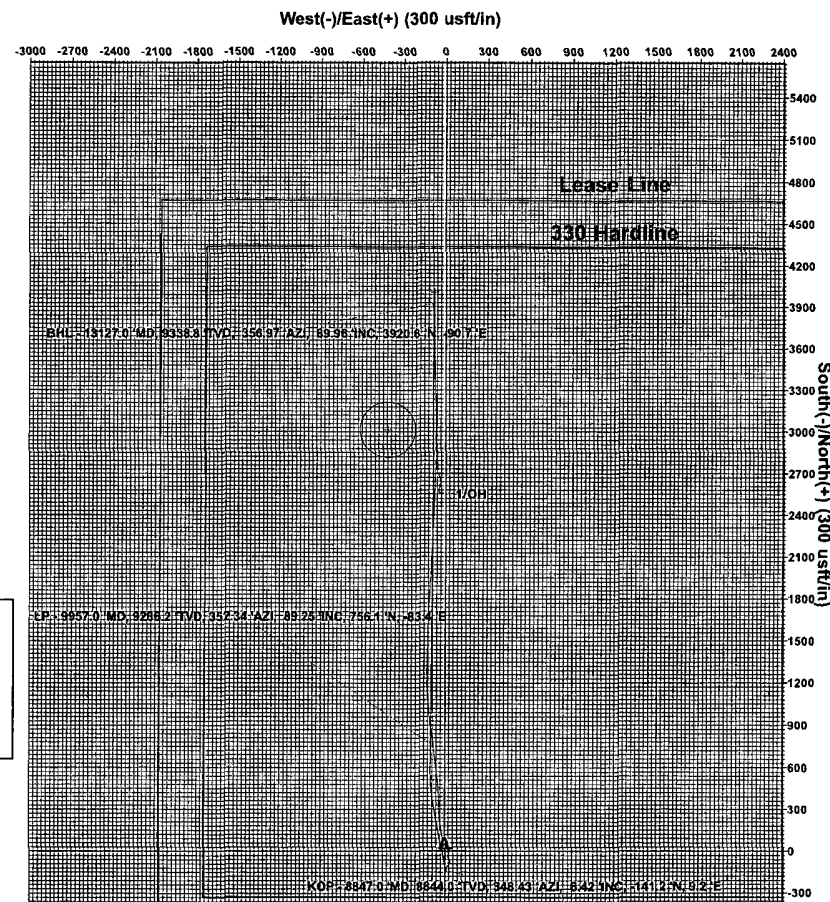
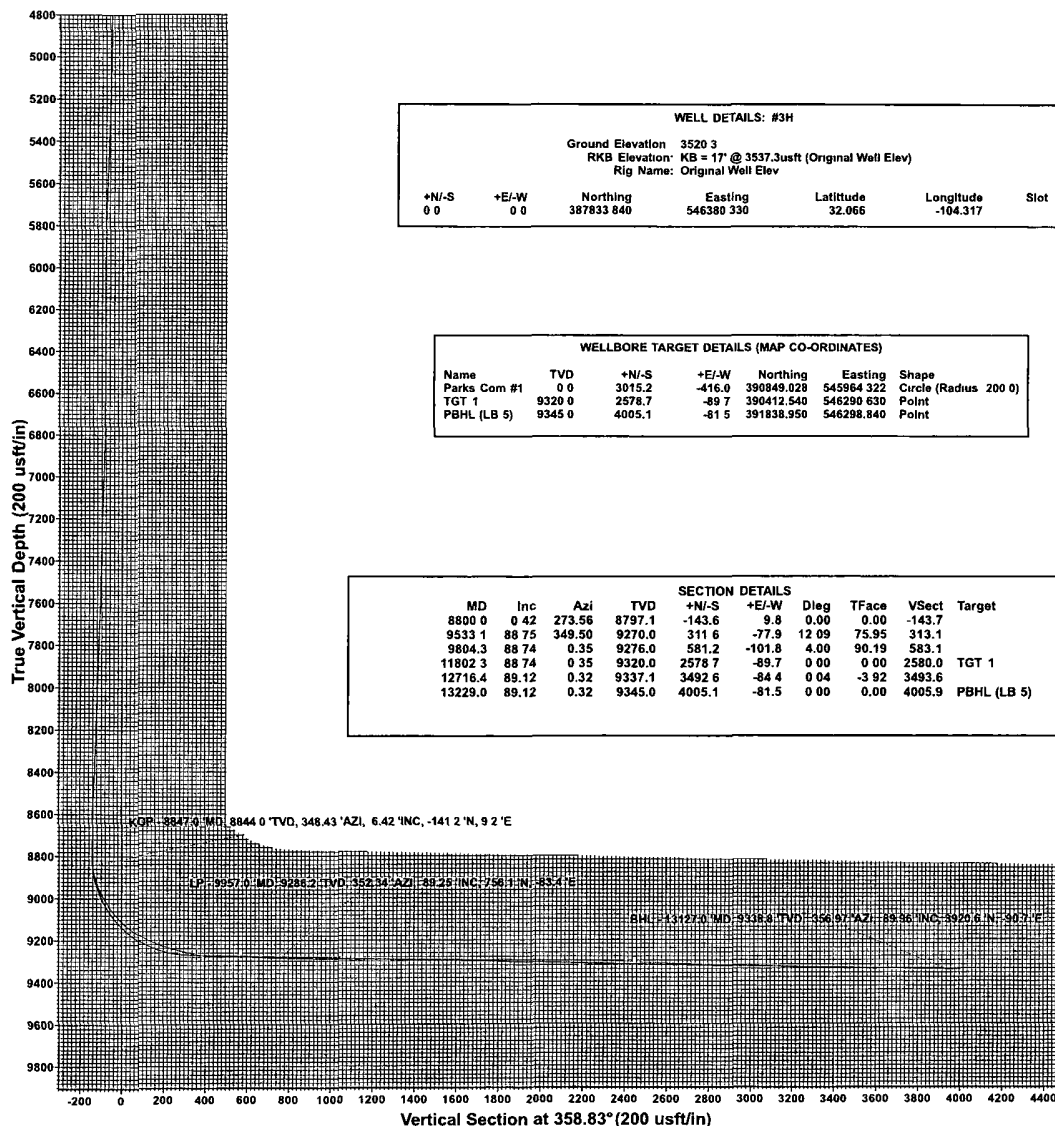


Azimuths to Grid North
True North: -0.01°
Magnetic North: 7.80°

Magnetic Field
Strength: 48401.4snT
Dip Angle: 59.92°
Date: 3/22/2012
Model: IGRF200510



A Schlumberger Company



EOW

PROJECT DETAILS: Eddy County(NAD83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Local North: Grid

Plan Post Gyro Plan #4 (#3H/OH)			
Created By	Michael Trout	Date	13 39, April 27 2012
Checked		Date	

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Eddy County(NAD83)

Lucky Bamboo 5 Field

Plan

Original Well Elev

OH

Post Gyro Plan #4