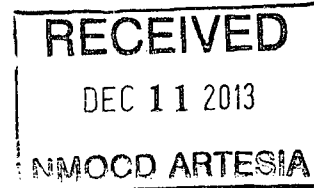




COG OPER, LLC
RECEIVED
OCT 21 2013
ARTESIA WEST

PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288



October 14, 2013

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701

15-4552

RE: Canvasback 13 Federal #4H
190' FNL & 2130' FEL
Sec. 13, T24S, R31E
Eddy County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

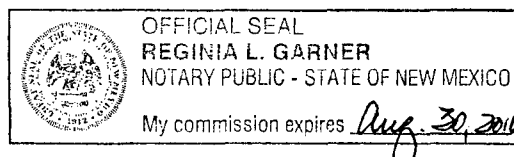
Very truly yours,

Eddie LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 14th day of October, 2013.

Notary Public



Canvasback 13 Federal #4H

Date	Depth	Deviation	Direction	TVD	Horiz Disp
9/16/2013	265	0.70	0.00	0.00	0.00
9/16/2013	477	0.40	0.00	0.00	0.00
9/16/2013	843	0.20	0.00	0.00	0.00
9/18/2013	1011	0.30	0.00	0.00	0.00
9/18/2013	1253	0.60	0.00	0.00	0.00
9/18/2013	1498	0.40	0.00	0.00	0.00
9/19/2013	1731	0.20	0.00	0.00	0.00
9/19/2013	1977	0.60	0.00	0.00	0.00
9/19/2013	2227	1.70	0.00	0.00	0.00
9/19/2013	2382	1.70	0.00	0.00	0.00
9/19/2013	2541	1.50	0.00	0.00	0.00
9/19/2013	2678	1.30	0.00	0.00	0.00
9/19/2013	2832	1.60	0.00	0.00	0.00
9/19/2013	2989	2.00	0.00	0.00	0.00
9/20/2013	3163	1.40	0.00	0.00	0.00
9/20/2013	3352	0.80	0.00	0.00	0.00
9/21/2013	3700	0.40	0.00	0.00	0.00
9/21/2013	3922	1.90	0.00	0.00	0.00
9/21/2013	4078	2.40	0.00	0.00	0.00
9/21/2013	4233	3.20	0.00	0.00	0.00
9/22/2013	4361	2.70	0.00	0.00	0.00
9/22/2013	4453	2.40	0.00	0.00	0.00
9/27/2013	4781	1.70	0.00	0.00	0.00
9/25/2013	5171	0.70	0.00	0.00	0.00
9/25/2013	5609	0.30	0.00	0.00	0.00
9/25/2013	6050	0.30	0.00	0.00	0.00
9/25/2013	6492	0.40	0.00	0.00	0.00
9/26/2013	6871	0.50	0.00	0.00	0.00
9/28/2013	7369	0.80	0.00	0.00	0.00
9/30/2013	7803	1.60	205.50	7800.00	33.90
9/30/2013	7833	4.40	179.90	7830.00	35.50
9/30/2013	7865	905.00	168.30	7862.50	39.33
9/30/2013	7896	12.80	168.30	7892.91	45.21
10/1/2013	7928	15.30	169.30	7924.05	52.80
10/1/2013	7959	17.50	172.30	7953.79	61.45
10/1/2013	7990	22.00	174.20	7982.96	71.86
10/2/2013	8021	27.30	173.30	8011.13	84.71
10/2/2013	8053	31.80	171.80	8065.80	100.36
10/2/2013	8085	34.20	166.10	8065.80	117.47
10/2/2013	8115	36.20	163.50	9090.00	134.10
10/2/2013	8178	43.20	158.40	8139.00	171.80
10/3/2013	8207	45.50	154.70	8159.76	190.49
10/3/2013	8239	47.40	154.50	8181.81	211.50

Date	Depth	Deviation	Direction	TVD	Horiz Disp
10/3/2013	8302	54.80	160.20	8221.41	265.85
10/3/2013	8334	57.90	163.00	8239.00	282.18
10/3/2013	8397	61.50	168.80	8270.00	335.01
10/3/2013	8459	64.30	175.30	8298.00	389.80
10/3/2013	8490	66.40	177.90	8311.83	417.95
10/3/2013	8522	67.90	179.90	8324.26	447.43
10/3/2013	8549	64.30	175.30	8298.20	389.82
10/3/2013	8553	69.70	181.30	8335.47	476.33
10/4/2013	8584	72.40	182.80	8345.53	505.62
10/4/2013	8616	75.90	183.20	8354.27	536.35
10/4/2013	8648	78.50	183.50	8361.36	567.48
10/4/2013	8680	82.70	183.20	8366.00	598.90
10/4/2013	8700	86.00	182.80	8369.00	629.70
10/4/2013	8739	86.10	182.50	8371.56	657.67
10/5/2013	8770	86.50	182.30	8373.51	688.57
10/5/2013	8989	91.10	182.00	8375.73	907.31
10/5/2013	9176	90.50	180.00	8374.10	1094.23
10/5/2013	9364	90.60	180.20	8372.00	1282.00
10/5/2013	9551	87.20	181.10	8375.00	1475.00
10/5/2013	9644	88.20	181.80	8379.00	1561.00
10/5/2013	9738	88.80	182.50	838.69	1655.80
10/5/2013	9833	90.00	183.20	8382.68	1750.69
10/5/2013	9927	90.70	183.50	8382.11	1844.45
10/6/2013	10116	90.00	183.50	8377.90	2032.86
10/6/2013	10210	89.80	183.90	8378.06	2126.62
10/6/2013	10397	87.50	182.50	8380.62	2313.19
10/6/2013	10490	88.50	182.50	8383.00	2406.00
10/6/2013	10586	90.70	183.20	8384.00	2501.00
10/6/2013	10681	89.10	183.90	8384.70	2596.64
10/7/2013	10776	92.00	184.00	8383.00	2691.00
10/7/2013	10960	89.40	182.50	8379.56	2874.82
10/7/2013	11061	90.00	182.70	8380.01	2975.68
10/8/2013	11156	90.40	183.70	8379.67	3070.50
10/8/2013	11249	89.80	183.70	8379.50	3163.26
10/8/2013	11344	88.20	182.80	8381.17	3258.06
10/8/2013	11439	87.10	180.70	8385.06	3352.91
10/8/2013	11534	89.50	181.10	8387.88	3447.83
10/9/2013	11629	90.40	180.40	8387.97	3542.82
10/9/2013	11724	92.70	179.90	8385.40	3637.77
10/9/2013	11819	91.20	179.00	8382.16	3732.72
10/9/2013	12007	89.30	177.60	8380.59	3920.66
10/9/2013	12100	89.90	177.60	8381.24	4013.60
10/9/2013	12196	90.20	178.30	8381.15	4109.56
10/9/2013	12290	89.00	178.60	8381.72	0.00
10/9/2013	12480	90.50	179.90	8384.56	4393.47

Date	Depth	Deviation	Direction	TVD	Horiz Disp
10/9/2013	12575	90.00	179.70	8384.15	4488.47
10/10/2013	12670	89.60	179.70	8384.48	4583.47
10/10/2013	12763	90.00	180.20	8384.80	4676.47

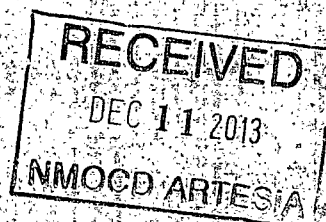


A GYRO TECHNOLOGIES INC. COMPANY

P.O. Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

October 7, 2013

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701



Attn: Kanicia Castillo

RE: **Canvasback 13 Federal No. 004H**

Please find enclosed a copy of the survey from 0.00' to 7800.00' ran on the above referenced well.

Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 7th day of October, A.D. 2013, by Keith Havelka.




Meredith Darden
Notary Public, State of Texas

Company: COG Operating LLC (Concho)
Lease/Well: Canvasback 13 Federal/No. 004H



Rig Name: Silver Oak 7
State/County: New Mexico/Eddy
Latitude: 32.22, Longitude: -103.73
GRID North is 0.32 Degrees East of True North
VS-Azi: 0.00 Degrees



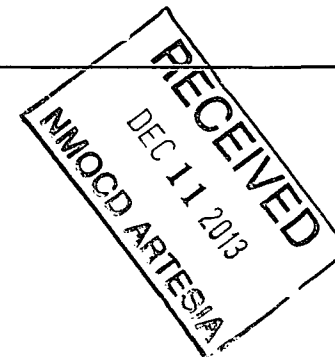
Depth Reference : RKB= 18'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 10/7/2013 / 11:33

Vaughn Energy Services
Midland, Texas
432-563-5444

Surveyor: Tim Dillon
Canvasback 13 Federal No. 004H / API 30-015-41552



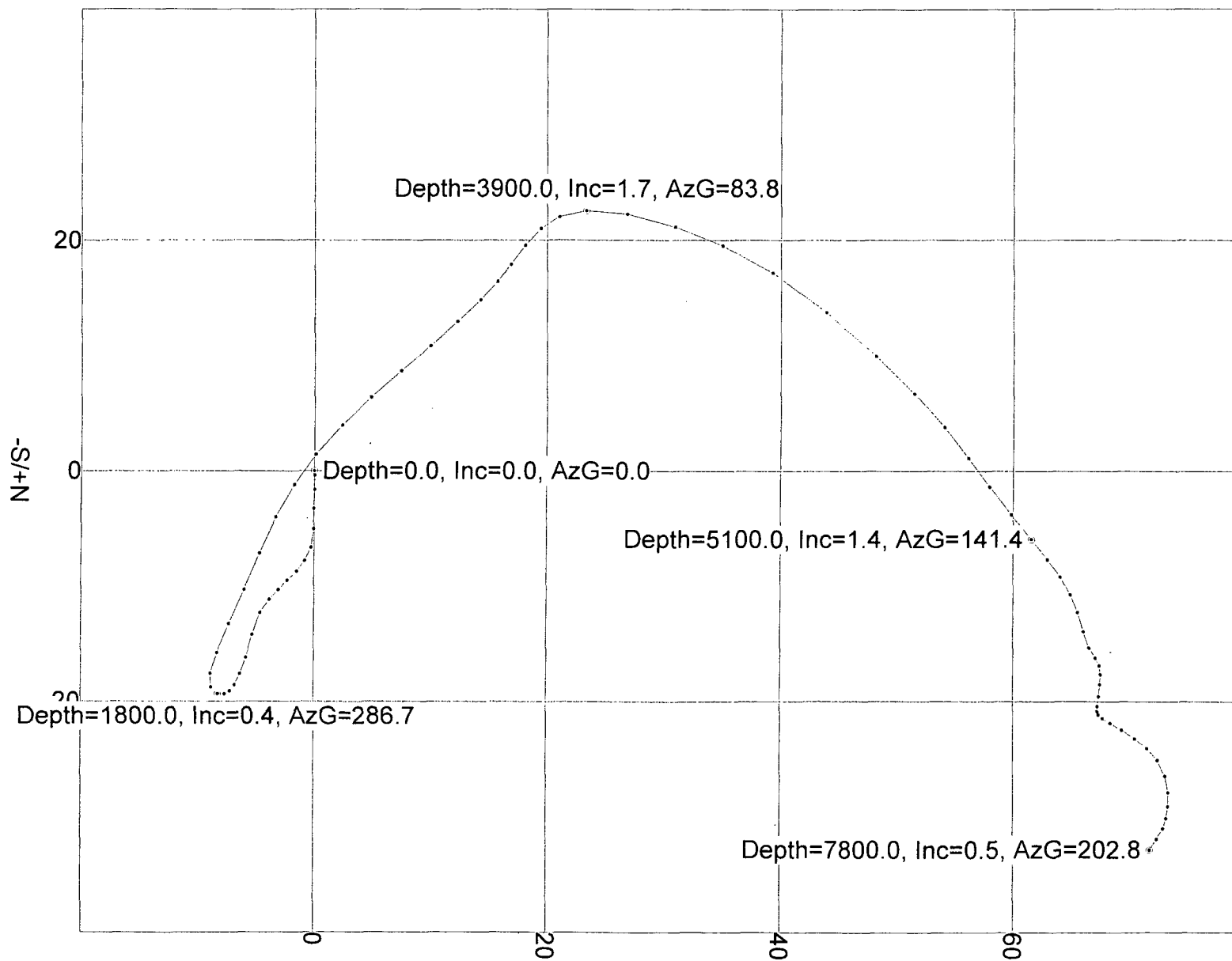
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.46	172.01	100.00	-0.40	0.06	0.40	172.01	0.46
200.00	0.92	184.03	199.99	-1.60	0.06	1.61	178.02	0.48
300.00	0.98	181.16	299.98	-3.26	-0.02	3.26	180.33	0.07
400.00	1.03	180.30	399.96	-5.02	-0.04	5.02	180.46	0.06
500.00	0.84	197.32	499.95	-6.61	-0.26	6.62	182.27	0.34
600.00	0.64	214.35	599.94	-7.77	-0.79	7.81	185.84	0.29
700.00	0.65	221.27	699.93	-8.66	-1.49	8.79	189.74	0.08
800.00	0.67	226.18	799.93	-9.49	-2.28	9.76	193.52	0.06
900.00	0.65	223.51	899.92	-10.31	-3.09	10.76	196.71	0.03
1000.00	0.64	222.85	999.91	-11.13	-3.87	11.78	199.16	0.02
1100.00	0.99	207.90	1099.90	-12.30	-4.65	13.15	200.71	0.41
1200.00	1.34	192.95	1199.88	-14.20	-5.32	15.16	200.52	0.46
1300.00	1.03	198.47	1299.86	-16.19	-5.86	17.22	199.90	0.33
1400.00	0.72	201.99	1399.85	-17.62	-6.38	18.74	199.90	0.32
1500.00	0.50	212.71	1499.85	-18.56	-6.85	19.79	200.25	0.25
1600.00	0.28	223.42	1599.84	-19.11	-7.25	20.44	200.78	0.23
1700.00	0.33	255.04	1699.84	-19.36	-7.69	20.83	201.68	0.17
1800.00	0.38	286.67	1799.84	-19.34	-8.28	21.04	203.19	0.20

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.61	330.54	1899.84	-18.78	-8.86	20.76	205.27	0.43
2000.00	0.85	14.41	1999.83	-17.59	-8.94	19.73	206.94	0.59
2100.00	1.32	19.22	2099.81	-15.78	-8.37	17.86	207.96	0.48
2200.00	1.80	24.03	2199.77	-13.26	-7.36	15.16	209.03	0.49
2300.00	1.92	23.85	2299.72	-10.29	-6.04	11.93	210.41	0.12
2400.00	2.04	21.66	2399.66	-7.11	-4.71	8.53	213.51	0.14
2500.00	1.91	27.05	2499.60	-3.97	-3.29	5.16	219.65	0.22
2600.00	1.79	32.43	2599.55	-1.17	-1.70	2.06	235.41	0.21
2700.00	1.90	38.48	2699.50	1.44	0.17	1.45	6.62	0.22
2800.00	2.00	44.53	2799.44	3.98	2.42	4.66	31.32	0.23
2900.00	1.98	47.64	2899.38	6.39	4.92	8.07	37.62	0.11
3000.00	1.96	48.74	2999.32	8.68	7.48	11.46	40.77	0.04
3100.00	1.85	48.98	3099.27	10.86	9.98	14.75	42.58	0.11
3200.00	1.74	47.21	3199.22	12.95	12.31	17.87	43.55	0.12
3300.00	1.39	44.06	3299.18	14.86	14.27	20.60	43.85	0.35
3400.00	1.05	40.91	3399.16	16.42	15.72	22.73	43.74	0.35
3500.00	1.13	37.01	3499.14	17.91	16.91	24.63	43.37	0.11
3600.00	1.21	35.10	3599.12	19.56	18.12	26.66	42.81	0.09
3700.00	1.12	50.19	3699.10	21.05	19.47	28.68	42.77	0.32
3800.00	1.03	65.28	3799.08	22.05	21.04	30.48	43.66	0.30
3900.00	1.72	83.79	3899.05	22.59	23.35	32.48	45.95	0.81
4000.00	2.41	102.30	3998.99	22.30	26.89	34.93	50.32	0.95
4100.00	2.47	108.68	4098.90	21.16	30.98	37.52	55.66	0.28
4200.00	2.54	115.07	4198.80	19.54	35.03	40.11	60.85	0.29
4300.00	3.05	122.46	4298.68	17.17	39.28	42.87	66.39	0.62
4400.00	3.56	129.86	4398.52	13.76	43.90	46.01	72.60	0.66
4500.00	2.97	133.11	4498.35	9.99	48.18	49.20	78.28	0.61
4600.00	2.39	136.37	4598.24	6.72	51.51	51.94	82.57	0.60
4700.00	2.08	140.63	4698.17	3.80	54.10	54.23	85.98	0.35
4800.00	1.78	144.89	4798.11	1.13	56.14	56.15	88.85	0.34
4900.00	1.75	142.33	4898.06	-1.35	57.97	57.98	91.33	0.08
5000.00	1.72	141.78	4998.02	-3.74	59.83	59.95	93.58	0.03
5100.00	1.42	141.35	5097.98	-5.89	61.54	61.82	95.47	0.31
5200.00	1.13	140.92	5197.95	-7.62	62.93	63.39	96.90	0.29
5300.00	1.04	147.96	5297.94	-9.15	64.03	64.68	98.13	0.16
5400.00	0.96	154.99	5397.92	-10.68	64.86	65.74	99.35	0.15
5500.00	0.98	160.31	5497.91	-12.24	65.51	66.64	100.58	0.09
5600.00	1.01	165.62	5597.89	-13.90	66.01	67.46	101.89	0.10
5700.00	0.73	154.25	5697.88	-15.32	66.51	68.25	102.97	0.33

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	0.44	142.88	5797.88	-16.20	67.02	68.95	103.59	0.30
5900.00	0.45	162.72	5897.87	-16.88	67.37	69.45	104.07	0.15
6000.00	0.45	180.55	5997.87	-17.64	67.48	69.75	104.65	0.14
6100.00	0.55	184.16	6097.87	-18.51	67.44	69.93	105.35	0.10
6200.00	0.65	187.77	6197.86	-19.54	67.33	70.11	106.19	0.11
6300.00	0.37	184.24	6297.86	-20.43	67.23	70.26	106.90	0.27
6400.00	0.12	182.70	6397.86	-20.86	67.20	70.36	107.25	0.25
6500.00	0.24	151.58	6497.86	-21.15	67.29	70.54	107.45	0.14
6600.00	0.35	120.46	6597.85	-21.48	67.65	70.98	107.62	0.19
6700.00	0.54	121.05	6697.85	-21.88	68.32	71.74	107.76	0.20
6800.00	0.78	121.64	6797.84	-22.48	69.30	72.86	107.97	0.24
6900.00	0.77	126.95	6897.83	-23.25	70.42	74.16	108.27	0.07
7000.00	0.77	130.25	6997.83	-24.09	71.47	75.42	108.62	0.04
7100.00	0.84	147.28	7097.82	-25.14	72.38	76.62	109.15	0.25
7200.00	0.91	164.32	7197.80	-26.52	72.99	77.66	109.97	0.27
7300.00	0.77	175.08	7297.79	-27.96	73.26	78.42	110.89	0.21
7400.00	0.63	185.83	7397.79	-29.17	73.27	78.86	111.71	0.19
7500.00	0.56	193.07	7497.78	-30.20	73.10	79.09	112.44	0.10
7600.00	0.50	200.30	7597.78	-31.08	72.84	79.19	113.11	0.09
7700.00	0.75	219.35	7697.77	-31.99	72.27	79.04	113.88	0.33
7800.00	0.53	202.79	7797.76	-32.93	71.68	78.88	114.67	0.29



Vaughn Energy Services
Midland, Texas
432-563-5444
Surveyor: Tim Dillon
Canvasback 13 Federal No. 004H / API 30-015-41552



-W/+E
VES Survey Date: 09/29/2013



COG PRODUCTION, L.L.C.

EDDY COUNTY (NAD27)

SECTION 13

Canvasback 13 Federal #4H

Wellbore #1

Design: Wellbore #1

Standard Survey Report

10 October, 2013





Stryker Directional Survey Report



Company	COG PRODUCTION, L.L.C.	Local Co-ordinate Reference:	Well Canvasback 13 Federal #4H
Project	EDDY COUNTY (NAD27)	TVD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Site	SECTION 13	MD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Well	Canvasback 13 Federal #4H	North Reference:	Grid
Wellbore	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	EDDY COUNTY (NAD27), NM-East		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	SECTION 13
------	------------

Site Position:		Northing:	445,731.20 usft	Latitude:	32° 13' 26.325 N
From:	Map	Easting:	687,423.40 usft	Longitude:	103° 43' 38.130 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.32 °

Well	Canvasback 13 Federal #4H					
Well Position	+N/-S	0.0 usft	Northing:	445,727.30 usft	Latitude:	32° 13' 26.323 N
	+E/-W	0.0 usft	Easting:	686,763.60 usft	Longitude:	103° 43' 45.811 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,582.0 usft	

Wellbore	Wellbore #1
----------	-------------

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/1/2013	7.38	60.10	48,368

Design	Wellbore #1
--------	-------------

Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	179.65

Survey Program		Date 10/10/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
99.1	7,740.0	VES Gyro Survey #1 (Wellbore #1)	SRG-GYRO-MS	surface readout gyro multishot
7,771.0	12,835.0	MWD Survey #2 (Wellbore #1)	MWD	MWD - Standard

Survey	Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
	99.1	0.46	172.01	99.1	-0.4	0.1	0.4	0.46	0.46	0.00
	198.3	0.92	184.03	198.3	-1.6	0.1	1.6	0.48	0.46	12.13
	297.4	0.98	181.16	297.4	-3.2	0.0	3.2	0.08	0.06	-2.90
	396.5	1.03	180.30	396.5	-5.0	0.0	5.0	0.05	0.05	-0.87
	495.6	0.84	197.32	495.6	-6.5	-0.3	6.5	0.34	-0.19	17.17
	594.8	0.64	214.35	594.7	-7.7	-0.8	7.7	0.30	-0.20	17.18
	693.9	0.65	221.27	693.8	-8.6	-1.5	8.6	0.08	0.01	6.98
	793.0	0.67	226.18	793.0	-9.4	-2.3	9.4	0.06	0.02	4.95
	892.2	0.65	223.51	892.1	-10.2	-3.1	10.2	0.04	-0.02	-2.69



Stryker Directional Survey Report



Company:	COG PRODUCTION, L.L.C.	Local Co-ordinate Reference:	Well Canvasback 13 Federal #4H
Project:	EDDY COUNTY (NAD27)	TVD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Site:	SECTION 13	MD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Well:	Canvasback 13 Federal #4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
991.3	0.64	222.85	991.2	-11.0	-3.8	11.0	0.01	-0.01	-0.67
1,090.4	0.99	207.90	1,090.3	-12.2	-4.6	12.2	0.41	0.35	-15.08
1,189.6	1.34	192.95	1,189.4	-14.1	-5.3	14.0	0.46	0.35	-15.08
1,288.7	1.03	198.47	1,288.6	-16.0	-5.8	16.0	0.33	-0.31	5.57
1,387.2	0.72	201.99	1,387.1	-17.5	-6.3	17.4	0.32	-0.31	3.57
1,486.9	0.50	212.71	1,486.8	-18.4	-6.8	18.4	0.25	-0.22	10.75
1,586.1	0.28	223.42	1,585.9	-18.9	-7.2	18.9	0.23	-0.22	10.80
1,685.2	0.33	255.04	1,685.1	-19.2	-7.6	19.2	0.17	0.05	31.90
1,784.3	0.38	286.67	1,784.2	-19.2	-8.2	19.1	0.20	0.05	31.91
1,883.5	0.61	330.54	1,883.3	-18.6	-8.8	18.6	0.43	0.23	44.26
1,982.6	0.85	14.41	1,982.4	-17.5	-8.9	17.4	0.59	0.24	44.26
2,081.7	1.32	19.22	2,081.5	-15.7	-8.3	15.6	0.48	0.47	4.85
2,180.9	1.80	24.03	2,180.6	-13.2	-7.3	13.1	0.50	0.48	4.85
2,280.0	1.92	23.85	2,279.7	-10.2	-6.0	10.2	0.12	0.12	-0.18
2,379.1	2.04	21.66	2,378.8	-7.1	-4.7	7.0	0.14	0.12	-2.21
2,478.2	1.91	27.05	2,477.9	-4.0	-3.3	3.9	0.23	-0.13	5.44
2,577.4	1.79	32.43	2,576.9	-1.2	-1.7	1.2	0.21	-0.12	5.43
2,676.5	1.90	38.48	2,676.0	1.4	0.2	-1.4	0.23	0.11	6.10
2,775.6	2.00	44.53	2,775.1	3.9	2.4	-3.9	0.23	0.10	6.10
2,874.8	1.98	47.64	2,874.2	6.3	4.9	-6.3	0.11	-0.02	3.14
2,973.9	1.96	48.74	2,973.2	8.6	7.4	-8.6	0.04	-0.02	1.11
3,073.0	1.85	48.98	3,072.3	10.8	9.9	-10.7	0.11	-0.11	0.24
3,172.2	1.74	47.21	3,171.4	12.8	12.2	-12.8	0.12	-0.11	-1.79
3,271.3	1.39	44.06	3,270.5	14.7	14.1	-14.6	0.36	-0.35	-3.18
3,370.4	1.05	40.91	3,369.6	16.3	15.6	-16.2	0.35	-0.34	-3.18
3,469.5	1.13	37.01	3,468.7	17.7	16.8	-17.6	0.11	0.08	-3.93
3,568.7	1.21	35.10	3,567.8	19.4	17.9	-19.3	0.09	0.08	-1.93
3,667.8	1.12	50.19	3,666.9	20.9	19.3	-20.7	0.32	-0.09	15.22
3,766.9	1.03	65.28	3,766.0	21.8	20.8	-21.7	0.30	-0.09	15.22
3,866.1	1.72	83.79	3,865.1	22.4	23.1	-22.2	0.82	0.70	18.67
3,965.2	2.41	102.30	3,964.2	22.1	26.7	-21.9	0.96	0.70	18.67
4,064.3	2.47	108.68	4,063.2	21.0	30.7	-20.8	0.28	0.06	6.44
4,163.5	2.54	115.07	4,162.3	19.4	34.7	-19.1	0.29	0.07	6.45
4,262.6	3.05	122.46	4,261.3	17.0	38.9	-16.8	0.63	0.51	7.45
4,361.7	3.56	129.86	4,360.2	13.6	43.5	-13.4	0.67	0.51	7.46
4,460.8	2.97	133.11	4,459.2	9.9	47.8	-9.6	0.62	-0.60	3.28
4,560.0	2.39	136.37	4,558.2	6.6	51.1	-6.3	0.60	-0.59	3.29
4,659.1	2.08	140.63	4,657.3	3.8	53.6	-3.4	0.35	-0.31	4.30
4,758.2	1.78	144.89	4,756.4	1.1	55.7	-0.8	0.34	-0.30	4.30
4,857.4	1.75	142.33	4,855.4	-1.4	57.5	1.7	0.09	-0.03	-2.58
4,956.5	1.72	141.78	4,954.5	-3.7	59.3	4.1	0.03	-0.03	-0.55
5,055.6	1.42	141.35	5,053.6	-5.8	61.0	6.2	0.30	-0.30	-0.43
5,154.8	1.13	140.92	5,152.7	-7.6	62.4	7.9	0.29	-0.29	-0.43



Stryker Directional Survey Report



Company:	COG PRODUCTION, L.L.C.	Local Co-ordinate Reference:	Well Canvasback 13 Federal #4H
Project:	EDDY COUNTY (NAD27)	TVD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Site:	SECTION 13	MD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Well:	Canvasback 13 Federal #4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,253.9	1.04	147.96	5,251.8	-9.1	63.5	9.5	0.16	-0.09	7.10	
5,353.0	0.96	154.99	5,351.0	-10.6	64.3	11.0	0.15	-0.08	7.09	
5,452.1	0.98	160.31	5,450.1	-12.2	64.9	12.5	0.09	0.02	5.37	
5,551.3	1.01	165.62	5,549.2	-13.8	65.4	14.2	0.10	0.03	5.36	
5,650.4	0.73	154.25	5,648.3	-15.2	65.9	15.6	0.33	-0.28	-11.47	
5,749.5	0.44	142.88	5,747.4	-16.1	66.4	16.5	0.31	-0.29	-11.47	
5,848.7	0.45	162.72	5,846.6	-16.8	66.8	17.2	0.15	0.01	20.01	
5,947.8	0.45	180.55	5,945.7	-17.5	66.9	17.9	0.14	0.00	17.99	
6,046.9	0.55	184.16	6,044.8	-18.4	66.9	18.8	0.11	0.10	3.64	
6,146.1	0.65	187.77	6,143.9	-19.4	66.8	19.8	0.11	0.10	3.64	
6,245.2	0.37	184.24	6,243.1	-20.3	66.7	20.7	0.28	-0.28	-3.56	
6,344.3	0.12	182.70	6,342.2	-20.7	66.6	21.1	0.25	-0.25	-1.55	
6,443.4	0.24	151.58	6,441.3	-21.0	66.7	21.4	0.15	0.12	-31.39	
6,542.6	0.35	120.46	6,540.5	-21.3	67.1	21.7	0.19	0.11	-31.39	
6,641.7	0.54	121.05	6,639.6	-21.7	67.7	22.1	0.19	0.19	0.60	
6,740.8	0.78	121.64	6,738.7	-22.3	68.7	22.7	0.24	0.24	0.60	
6,840.0	0.77	126.95	6,837.8	-23.1	69.8	23.5	0.07	-0.01	5.36	
6,939.1	0.77	130.25	6,936.9	-23.9	70.9	24.3	0.04	0.00	3.33	
7,038.2	0.84	147.28	7,036.1	-25.0	71.8	25.4	0.25	0.07	17.18	
7,137.4	0.91	164.32	7,135.2	-26.3	72.4	26.8	0.27	0.07	17.19	
7,236.5	0.77	175.08	7,234.3	-27.7	72.6	28.2	0.21	-0.14	10.85	
7,335.6	0.63	185.83	7,333.4	-28.9	72.6	29.4	0.19	-0.14	10.84	
7,434.7	0.56	193.07	7,432.5	-30.0	72.5	30.4	0.10	-0.07	7.30	
7,533.9	0.50	200.30	7,531.7	-30.8	72.2	31.3	0.09	-0.06	7.29	
7,633.0	0.75	219.35	7,630.8	-31.7	71.7	32.2	0.32	0.25	19.22	
7,732.1	0.53	202.79	7,729.9	-32.7	71.1	33.1	0.29	-0.22	-16.71	
7,771.0	0.80	224.10	7,768.8	-33.0	70.8	33.5	0.93	0.69	54.84	
7,803.0	1.60	205.50	7,800.8	-33.6	70.5	34.0	2.75	2.50	-58.13	
7,833.0	4.40	179.90	7,830.7	-35.1	70.3	35.6	10.12	9.33	-85.33	
7,865.0	9.50	168.30	7,862.5	-38.9	70.8	39.4	16.45	15.94	-36.25	
7,896.0	12.80	168.30	7,892.9	-44.8	72.0	45.3	10.65	10.65	0.00	
7,928.0	15.30	169.30	7,923.9	-52.4	73.5	52.9	7.85	7.81	3.13	
7,959.0	17.50	172.30	7,953.7	-61.1	74.9	61.5	7.60	7.10	9.68	
7,990.0	22.00	174.20	7,982.8	-71.5	76.1	71.9	14.66	14.52	6.13	
8,021.0	27.30	173.30	8,011.0	-84.3	77.5	84.8	17.14	17.10	-2.90	
8,053.0	31.80	171.80	8,038.8	-100.0	79.6	100.4	14.25	14.06	-4.69	
8,085.0	34.20	166.10	8,065.7	-117.0	83.0	117.5	12.26	7.50	-17.81	
8,115.0	36.20	163.50	8,090.2	-133.7	87.5	134.3	8.33	6.67	-8.67	
8,147.0	39.00	160.30	8,115.5	-152.3	93.6	152.8	10.66	8.75	-10.00	
8,178.0	43.20	158.40	8,138.9	-171.3	100.8	171.9	14.13	13.55	-6.13	
8,207.0	45.50	154.70	8,159.6	-189.9	108.9	190.6	11.93	7.93	-12.76	
8,239.0	47.40	154.50	8,181.7	-210.9	118.8	211.6	5.95	5.94	-0.63	
8,270.0	50.90	157.70	8,202.0	-232.3	128.3	233.1	13.72	11.29	10.32	



Stryker Directional Survey Report



Company:	COG PRODUCTION, L.L.C.	Local Co-ordinate Reference:	Well Canvasback 13 Federal #4H
Project:	EDDY COUNTY (NAD27)	TVD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Site:	SECTION 13	MD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Well:	Canvasback 13 Federal #4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,302.0	54.80	160.20	8,221.3	-256.1	137.4	256.9	13.68	12.19	7.81	
8,334.0	57.90	163.00	8,239.0	-281.4	145.8	282.3	12.12	9.69	8.75	
8,366.0	59.80	166.00	8,255.6	-307.8	153.1	308.7	9.98	5.94	9.38	
8,397.0	61.50	168.80	8,270.8	-334.1	159.0	335.1	9.59	5.48	9.03	
8,428.0	63.40	172.30	8,285.1	-361.2	163.5	362.2	11.74	6.13	11.29	
8,459.0	64.30	175.30	8,298.8	-388.9	166.5	389.9	9.16	2.90	9.68	
8,490.0	66.40	177.90	8,311.7	-417.0	168.2	418.0	10.20	6.77	8.39	
8,522.0	67.90	179.90	8,324.1	-446.5	168.8	447.5	7.43	4.69	6.25	
8,553.0	69.70	181.30	8,335.3	-475.4	168.5	476.4	7.17	5.81	4.52	
8,569.6	71.14	182.11	8,340.9	-491.0	168.0	492.0	9.84	8.70	4.88	
LP#2 Canvasback 13 Federal #4										
8,570.4	71.22	182.15	8,341.2	-491.8	168.0	492.8	9.84	8.71	4.83	
LP Canvasback 13 Federal #4H										
8,584.0	72.40	182.80	8,345.4	-504.7	167.4	505.7	9.84	8.72	4.79	
8,616.0	75.90	183.20	8,354.2	-535.4	165.8	536.4	11.00	10.94	1.25	
8,648.0	78.50	183.50	8,361.2	-566.6	164.0	567.6	8.18	8.13	0.94	
8,680.0	82.70	183.20	8,366.5	-598.1	162.1	599.1	13.16	13.13	-0.94	
8,711.0	86.00	182.80	8,369.5	-628.9	160.5	629.9	10.72	10.65	-1.29	
8,739.0	86.10	182.50	8,371.4	-656.8	159.2	657.7	1.13	0.36	-1.07	
8,770.0	86.50	182.30	8,373.4	-687.7	157.9	688.6	1.44	1.29	-0.65	
8,801.0	88.50	182.50	8,374.8	-718.6	156.6	719.6	6.48	6.45	0.65	
8,832.0	89.20	182.30	8,375.4	-749.6	155.3	750.5	2.35	2.26	-0.65	
8,893.0	89.50	182.00	8,376.1	-810.6	153.1	811.5	0.70	0.49	-0.49	
8,989.0	91.10	182.00	8,375.6	-906.5	149.7	907.4	1.67	1.67	0.00	
9,082.0	90.20	181.30	8,374.6	-999.4	147.0	1,000.3	1.23	-0.97	-0.75	
9,176.0	90.50	180.00	8,374.0	-1,093.4	146.0	1,094.3	1.42	0.32	-1.38	
9,271.0	90.60	177.60	8,373.1	-1,188.4	147.9	1,189.3	2.53	0.11	-2.53	
9,364.0	90.60	180.20	8,372.1	-1,281.4	149.7	1,282.3	2.80	0.00	2.80	
9,457.0	89.10	182.00	8,372.3	-1,374.4	147.9	1,375.2	2.52	-1.61	1.94	
9,551.0	87.20	181.10	8,375.4	-1,468.3	145.4	1,469.1	2.24	-2.02	-0.96	
9,644.0	88.20	181.80	8,379.1	-1,561.2	143.1	1,562.0	1.31	1.08	0.75	
9,738.0	88.80	182.50	8,381.6	-1,655.1	139.5	1,655.9	0.98	0.64	0.74	
9,833.0	90.00	183.20	8,382.6	-1,749.9	134.8	1,750.7	1.46	1.26	0.74	
9,927.0	90.70	183.50	8,382.0	-1,843.8	129.3	1,844.5	0.81	0.74	0.32	
10,022.0	92.20	184.40	8,379.6	-1,938.5	122.8	1,939.2	1.84	1.58	0.95	
10,116.0	90.00	183.50	8,377.8	-2,032.3	116.3	2,032.9	2.53	-2.34	-0.96	
10,210.0	89.80	183.90	8,377.9	-2,126.1	110.2	2,126.7	0.48	-0.21	0.43	
10,302.0	89.80	183.50	8,378.3	-2,217.9	104.3	2,218.5	0.43	0.00	-0.43	
10,397.0	87.50	182.50	8,380.5	-2,312.7	99.3	2,313.3	2.64	-2.42	-1.05	
10,490.0	88.50	182.50	8,383.7	-2,405.6	95.3	2,406.1	1.08	1.08	0.00	
10,586.0	90.70	183.20	8,384.4	-2,501.4	90.5	2,501.9	2.40	2.29	0.73	
10,681.0	89.10	183.90	8,384.6	-2,596.2	84.6	2,596.7	1.84	-1.68	0.74	
10,776.0	92.40	184.40	8,383.3	-2,691.0	77.7	2,691.4	3.51	3.47	0.53	
10,870.0	91.50	183.70	8,380.1	-2,784.7	71.1	2,785.1	1.21	-0.96	-0.74	



Stryker Directional Survey Report



Company:	COG PRODUCTION, L.L.C.	Local Co-ordinate Reference:	Well Canvasback 13 Federal #4H
Project:	EDDY COUNTY (NAD27)	TVD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Site:	SECTION 13	MD Reference:	GL 3582 +18 @ 3600.0usft (Silver Oak #7)
Well:	Canvasback 13 Federal #4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User.Db

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)
10,966.0	89.40	182.50	8,379.4	-2,880.5	65.9	2,880.9	2.52	-2.19	-1.25
11,061.0	90.00	182.70	8,379.9	-2,975.4	61.6	2,975.8	0.67	0.63	0.21
11,156.0	90.40	183.70	8,379.6	-3,070.3	56.3	3,070.6	1.13	0.42	1.05
11,249.0	89.80	183.70	8,379.4	-3,163.1	50.3	3,163.3	0.65	-0.65	0.00
11,344.0	88.20	182.80	8,381.0	-3,257.9	44.9	3,258.1	1.93	-1.68	-0.95
11,439.0	87.10	180.70	8,384.9	-3,352.8	42.0	3,353.0	2.49	-1.16	-2.21
11,534.0	89.50	181.10	8,387.8	-3,447.7	40.5	3,447.9	2.56	2.53	0.42
11,629.0	90.40	180.40	8,387.8	-3,542.7	39.3	3,542.9	1.20	0.95	-0.74
11,724.0	92.70	179.90	8,385.3	-3,637.7	39.0	3,637.9	2.48	2.42	-0.53
11,819.0	91.20	179.00	8,382.0	-3,732.6	39.9	3,732.8	1.84	-1.58	-0.95
11,914.0	90.70	179.00	8,380.5	-3,827.6	41.6	3,827.8	0.53	-0.53	0.00
12,007.0	89.30	177.60	8,380.5	-3,920.5	44.4	3,920.7	2.13	-1.51	-1.51
12,100.0	89.90	177.60	8,381.1	-4,013.5	48.3	4,013.7	0.65	0.65	0.00
12,196.0	90.20	178.30	8,381.0	-4,109.4	51.7	4,109.6	0.79	0.31	0.73
12,290.0	89.00	178.60	8,381.7	-4,203.4	54.2	4,203.6	1.32	-1.28	0.32
12,386.0	88.60	178.30	8,383.7	-4,299.3	56.8	4,299.6	0.52	-0.42	-0.31
12,480.0	90.50	179.90	8,384.4	-4,393.3	58.3	4,393.6	2.64	2.02	1.70
12,575.0	90.00	179.70	8,384.0	-4,488.3	58.6	4,488.6	0.57	-0.53	-0.21
12,670.0	89.60	179.70	8,384.4	-4,583.3	59.1	4,583.6	0.42	-0.42	0.00
12,763.0	90.00	180.20	8,384.7	-4,676.3	59.2	4,676.5	0.69	0.43	0.54
12,835.0	90.00	180.20	8,384.7	-4,748.3	59.0	4,748.5	0.00	0.00	0.00

PBHL Canvasback 13 Federal #4H

Design Targets									
Target Name	hit/miss target	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude Longitude
LP Canvasback 13 Fe	-	0.00	0.01	8,364.6	-477.0	2.9	445,250.31	686,766.51	32° 13' 21.602 N 103° 43' 45.808 W
- actual wellpath misses target center by 167.4usft at 8569.0usft MD (8340.7 TVD, -490.4 N, 168.0 E)									
- Point									
PBHL Canvasback 13	-	0.00	0.00	8,390.0	-4,757.9	29.4	440,969.40	686,793.00	32° 12' 39.238 N 103° 43' 45.780 W
- actual wellpath misses target center by 31.5usft at 12835.0usft MD (8384.7 TVD, -4748.3 N, 59.0 E)									
- Point									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
7,732.1	7,729.9	-32.7	71.1	7732.1' MD VES Gyro
12,835.0	8,384.7	-4,748.3	59.0	12835' MD Projected to Bit



COMPANY: COG PRODUCTION, L.L.C.
WELL: Canvasback 13 Federal #4H
COUNTY: EDDY COUNTY (NAD27)
DATUM: NAD 1927 (NADCON CONUS)



RIG: Silver Oak 7
GRID CORRECTION: To convert a Magnetic Direction to a Grid Direction, Add 7.05°

OFFICE: 936.582.7296

GEODETIC ZONE: New Mexico East 3001									
GL 3582 +18 @ 3600.0usft (Silver Oak #7)									
GROUND ELEVATION: 3582.0									
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude				
0.0	0.0	445727.30	686763.60	32° 13' 26.323 N	103° 43' 45.811 W				

PLAN SECTIONS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	7896.0	12.80	168.30	7892.9	-44.8	72.0	0.00	0.00	45.3	
2	8723.3	89.76	180.80	8373.1	-641.5	87.2	9.34	12.82	642.0	
3	12840.2	89.76	180.80	8390.0	-4757.9	29.4	0.00	0.00	4758.0	PBHL Canvasback 13 Federal #4H

