

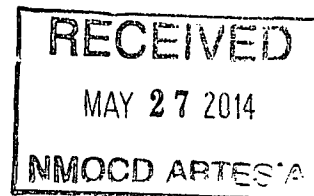


A GYRO TECHNOLOGIES INC. COMPANY

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

15-39515

March 11, 2014



COG Operating LLC (Concho)
One Concho Center
600 W. Illinois Avenue
Midland, TX 79701

Attn: Kanicia Castillo

Re: **Falabella 31 Fee No 008H**

Please find enclosed a copy of the survey from 0' to 2,190' ran on the above referenced well.

If I can be of any further service, please do not hesitate to call me at 800-606-4976.

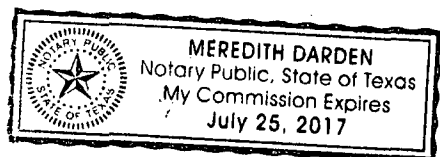
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 11th day of March, A.D., 2014, by Keith Havelka.

Meredith Darden
Notary Public, State of Texas





Company: COG Operating-Concho

Lease/Well: Falabella 31 Fee/No 008H

Location: Sec 31 T18S R26E

Rig Name: Silver Oak 3

State/County: New Mexico/Eddy

Latitude: 32.70, Longitude: -104.41

GRID North is 0.04 Degrees West of True North

VS-Azi: 0.00 Degrees



Depth Reference : RKB = 17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: falabella 31 fee #8h-de_01.ut

Minimum Curvature Method

Report Date/Time: 3/11/2014 / 15:01

Vaughn Energy Services

West Texas

Surveyor: Chris Bankson

432-563-5444

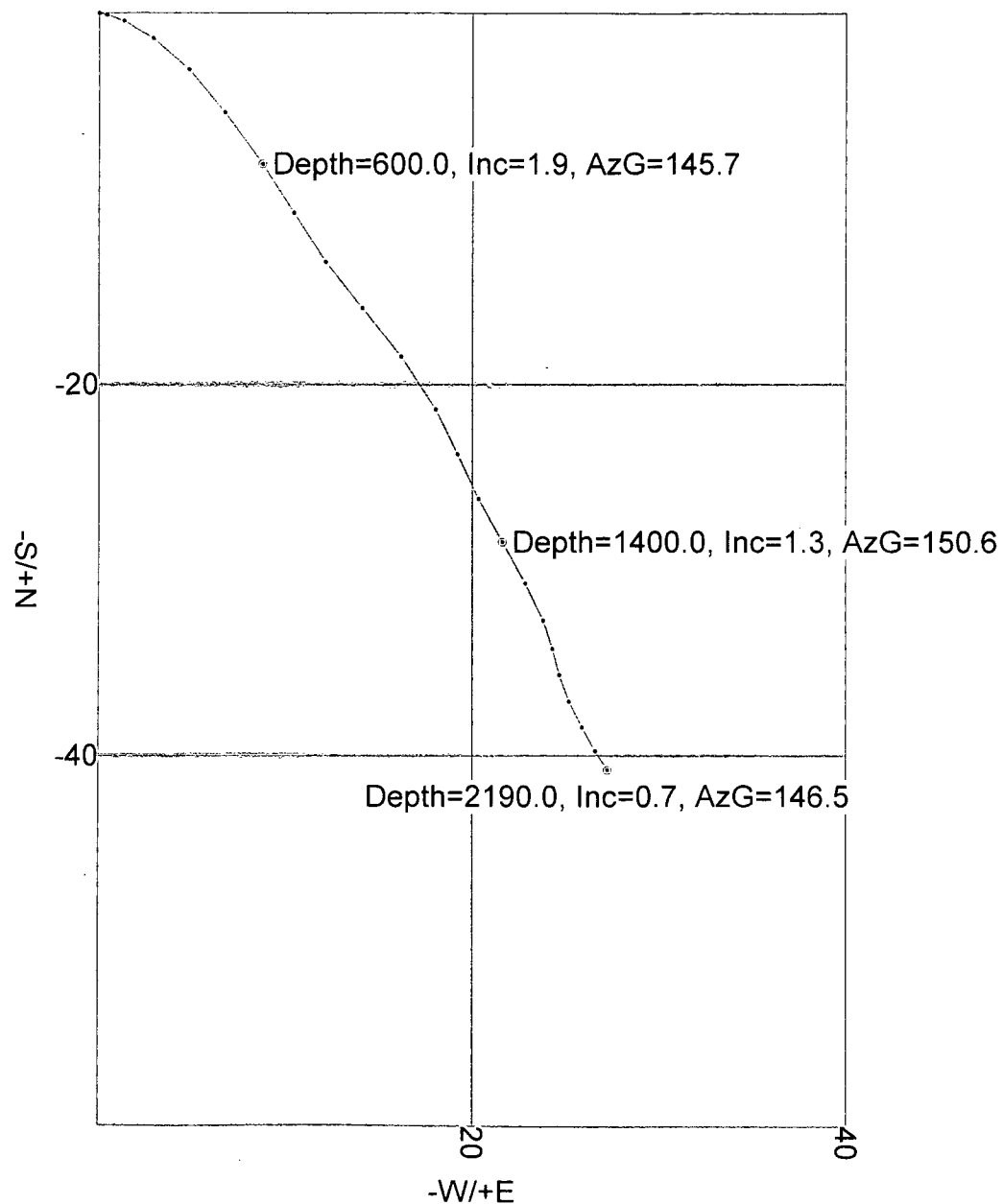
Falabella 31 Fee No 008H / API 30-015-39515

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section 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	0.00	****
100.00	0.50	104.53	100.00	-0.11	0.43	-0.11	0.44	104.53	0.50
200.00	0.65	111.81	199.99	-0.43	1.37	-0.43	1.44	107.37	0.16
300.00	1.46	124.60	299.98	-1.36	2.95	-1.36	3.25	114.83	0.85
400.00	1.46	137.29	399.94	-3.03	4.86	-3.03	5.73	121.89	0.32
500.00	1.99	142.73	499.90	-5.35	6.78	-5.35	8.64	128.26	0.55
600.00	1.93	145.66	599.84	-8.13	8.79	-8.13	11.97	132.76	0.12
700.00	1.64	149.94	699.79	-10.76	10.46	-10.76	15.00	135.81	0.32
800.00	1.95	144.87	799.74	-13.39	12.15	-13.39	18.08	137.77	0.35
900.00	1.68	138.20	899.69	-15.88	14.11	-15.88	21.24	138.37	0.35
1000.00	2.14	144.02	999.64	-18.48	16.19	-18.48	24.57	138.79	0.50
1100.00	1.76	150.21	1099.58	-21.33	18.05	-21.33	27.94	139.76	0.43
1200.00	1.34	159.48	1199.54	-23.76	19.22	-23.76	30.56	141.02	0.49
1300.00	1.70	151.31	1299.51	-26.16	20.35	-26.16	33.14	142.12	0.42
1400.00	1.33	150.61	1399.47	-28.47	21.63	-28.47	35.76	142.78	0.37
1500.00	1.59	151.50	1499.44	-30.71	22.86	-30.71	38.28	143.33	0.26
1600.00	0.96	160.23	1599.41	-32.71	23.81	-32.71	40.46	143.95	0.66
1700.00	0.88	163.47	1699.40	-34.24	24.31	-34.24	41.99	144.62	0.09
1800.00	0.78	168.07	1799.39	-35.64	24.67	-35.64	43.35	145.31	0.12

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.97	153.47	1899.38	-37.07	25.19	-37.07	44.82	145.80	0.29
2000.00	0.82	153.67	1999.36	-38.47	25.88	-38.47	46.37	146.06	0.15
2100.00	0.86	148.47	2099.35	-39.74	26.59	-39.74	47.82	146.22	0.08
2190.00	0.69	146.49	2189.35	-40.77	27.24	-40.77	49.03	146.25	0.19



Vaughn Energy Services
West Texas
Surveyor: Chris Bankson
432-563-5444
Falabella 31 Fee No 008H / API 30-015-39515



VES Survey Date: 02/22/2014



Project: Eddy County, NM (NAD 27 NME)
Site: Falabella 31 Fee
Well: #8H
Wellbore: WB1/Job #1410177
Design: Plan #3 02-22-14
Rig: Silver Oak 3



PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: 0.04°
Magnetic North: 7.73°
Magnetic Field
Strength: 48546.0nT
Dip Angle: 60.42°
Date: 01/27/2014
Model: IGRF2010_14

WELL DETAILS

+N-S	+E-W	Northing	Ground Level	Easting	Latitude	Longitude
0.00	0.00	617351.30	3391.00	475313.80	32° 41' 49.81692 N	104° 24' 48.89051 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSecl	Target	Annotation
1	2190.00	0.69	146.49	2189.35	-40.77	27.24	0.00	0.00	-40.93		Gyro tie-in, Start Drop 2.00/100'
2	2224.50	0.00	0.00	2223.85	-40.94	27.35	2.00	180.00	-41.11		Hold Vertical
3	2342.08	0.00	0.00	2341.43	-40.94	27.35	0.00	0.00	-41.11		KOP: Start Build 11.00/100'
4	3178.44	92.00	357.10	2681.98	497.42	0.08	11.00	357.10	497.41		LP at 92 Inc, Start Turn 2.00/100'
5	3305.89	92.00	359.65	2857.53	624.73	-3.53	2.00	89.96	624.73		EOT: 359.65 Azi
6	7533.82	92.00	359.65	2710.00	4850.00	-29.30	0.00	0.00	4850.09	PBHL-Falabella 31 #8H	TD at 7533.82

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
PBHL-Falabella 31 #8H	2710.00	4850.00	-29.30	622201.30	475284.50	32° 42' 37.81041 N	104° 24' 49.27640 W	Point
plan hits target center								
PP-Falabella 31 #8H	2734.55	180.00	-1.08	617531.30	475312.72	32° 41' 51.59813 N	104° 24' 48.90478 W	Point
plan misses target center by 32.11usft at 2821.93usft MD (2756.23 TVD, 164.63 N, 16.94 E)								

LEGEND

— #8H, WB1/Job #1410177, Surveys (Silver Oak 3) V0
— #4H, OH, Plan #1 01-30-13 V0
— Plan #3 02-22-14

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001

Local Origin: Well #8H, Grid North

Latitude: 32° 41' 49.81692 N
Longitude: 104° 24' 48.89051 W

Grid East: 475313.80
Grid North: 617351.30
Scale Factor: 1.000

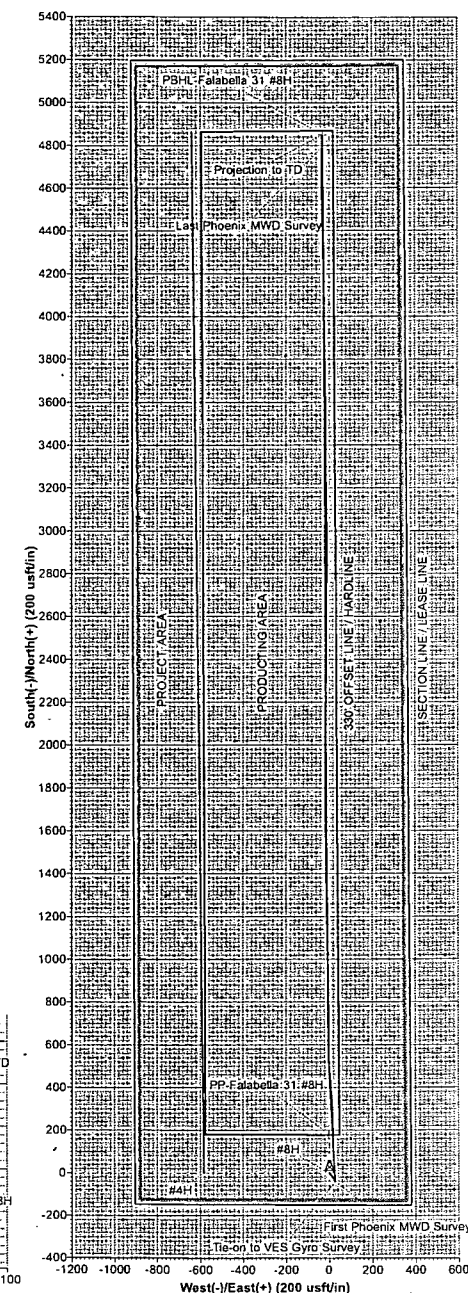
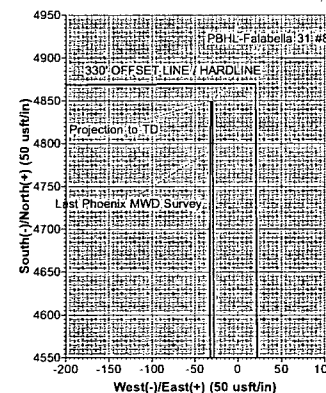
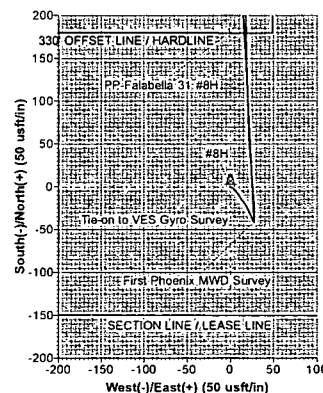
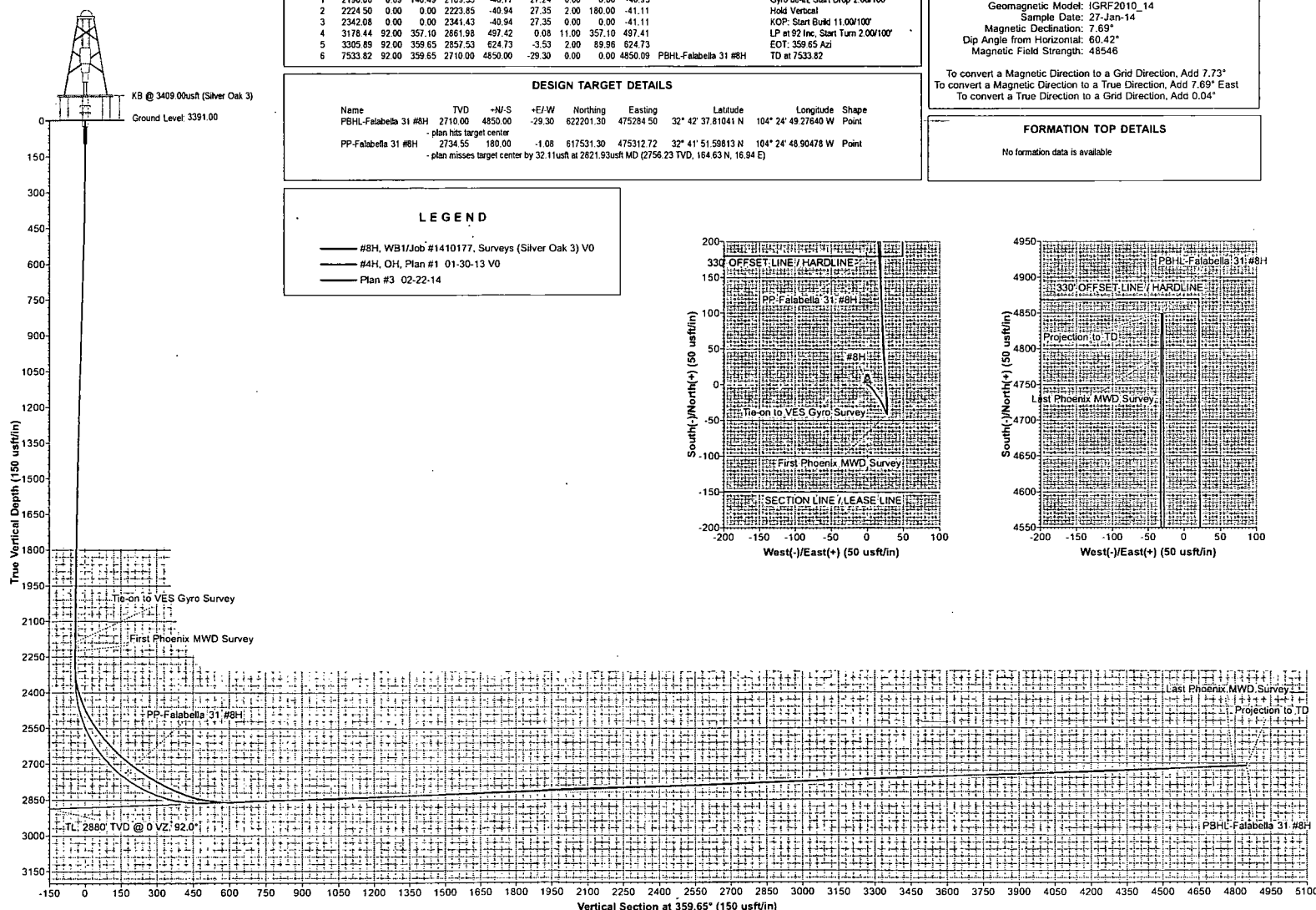
Geomagnetic Model: IGRF2010_14
Sample Date: 27-Jan-14

Magnetic Declination: 7.69°
Dip Angle from Horizontal: 60.42°
Magnetic Field Strength: 48546

To convert a Magnetic Direction to a Grid Direction, Add 7.73°
To convert a Magnetic Direction to a True Direction, Add 7.69° East
To convert a True Direction to a Grid Direction, Add 0.04°

FORMATION TOP DETAILS

No formation data is available





COG Operating LLC

Eddy County, NM (NAD 27 NME)

Falabella 31 Fee

#8H

WB1/Job #1410177

Survey: Phoenix MWD Survey

Phoenix Final Survey Report

03 March, 2014





Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)
2,190.00	0.69	146.49	2,189.35	-40.77	27.24	-40.94	0.00
Tie-on to VES Gyro Survey							
2,227.00	0.80	140.40	2,226.34	-41.15	27.53	-41.32	0.37
First Phoenix MWD Survey							
2,259.00	1.00	142.50	2,258.34	-41.55	27.84	-41.72	0.63
2,290.00	0.40	20.50	2,289.34	-41.66	28.04	-41.83	4.06
2,321.00	4.60	0.70	2,320.30	-40.32	28.10	-40.49	13.63
2,353.00	9.50	1.30	2,352.05	-36.39	28.17	-36.56	15.31
2,384.00	13.80	358.90	2,382.41	-30.13	28.16	-30.31	13.96
2,415.00	17.70	356.70	2,412.24	-21.73	27.82	-21.90	12.73
2,446.00	21.80	356.30	2,441.41	-11.28	27.17	-11.44	13.23



Phoenix Technology Services
Phoenix Final Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD 27 NME)	TVD Reference:	KB @ 3409.00usft (Silver Oak 3)
Site:	Falabella 31 Fee	MD Reference:	KB @ 3409.00usft (Silver Oak 3)
Well:	#8H	North Reference:	Grid
Wellbore:	WB1/Job #1410177	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR DB

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
2,477.00	25.50	354.50	2,469.80	1.11	26.16	0.95	12.16
2,509.00	28.60	354.60	2,498.29	15.60	24.78	15.45	9.69
2,540.00	31.70	355.80	2,525.10	31.11	23.49	30.97	10.19
2,571.00	35.00	356.30	2,550.99	48.11	22.31	47.98	10.68
2,602.00	37.80	357.20	2,575.94	66.48	21.28	66.35	9.19
2,634.00	40.40	358.20	2,600.77	86.64	20.47	86.51	8.36
2,665.00	42.90	358.30	2,623.93	107.23	19.84	107.11	8.07
2,696.00	45.40	358.40	2,646.17	128.81	19.22	128.69	8.07
2,727.00	48.20	358.90	2,667.39	151.40	18.69	151.29	9.11
2,758.00	50.30	359.20	2,687.63	174.88	18.30	174.77	6.81
2,789.00	52.60	359.60	2,706.94	199.12	18.05	199.01	7.49
2,820.00	54.80	359.40	2,725.30	224.11	17.83	223.99	7.12
2,851.00	57.00	358.10	2,742.67	249.77	17.27	249.66	7.90
2,883.00	58.70	357.60	2,759.70	276.84	16.25	276.73	5.47
2,914.00	60.70	357.60	2,775.34	303.58	15.13	303.48	6.45
2,945.00	63.20	356.80	2,789.92	330.90	13.79	330.81	8.38
2,977.00	65.50	356.10	2,803.77	359.69	12.00	359.61	7.45
3,008.00	67.60	355.70	2,816.11	388.06	9.97	387.99	6.88
3,039.00	70.40	355.30	2,827.21	416.91	7.70	416.85	9.11
3,070.00	74.10	354.90	2,836.66	446.32	5.18	446.28	12.00
3,102.00	77.00	355.50	2,844.65	477.19	2.58	477.17	9.24
3,133.00	80.00	356.70	2,850.83	507.50	0.52	507.48	10.39
3,164.00	82.90	358.40	2,855.44	538.12	-0.79	538.11	10.81
3,196.00	86.50	0.30	2,858.39	569.97	-1.15	569.97	12.71
3,227.00	90.50	0.80	2,859.20	600.96	-0.85	600.95	13.00
3,258.00	93.60	359.80	2,858.09	631.93	-0.69	631.92	10.51
3,278.00	93.90	359.40	2,856.79	651.89	-0.83	651.88	2.50
3,371.00	92.30	359.20	2,851.76	744.74	-1.96	744.74	1.73
3,465.00	91.20	359.50	2,848.89	838.69	-3.03	838.69	1.21
3,559.00	91.30	359.10	2,846.84	932.66	-4.18	932.67	0.44
3,652.00	91.60	359.50	2,844.48	1,025.62	-5.31	1,025.64	0.54
3,746.00	91.90	359.00	2,841.61	1,119.57	-6.54	1,119.59	0.62
3,839.00	92.20	358.90	2,838.29	1,212.50	-8.24	1,212.52	0.34
3,933.00	92.40	359.20	2,834.51	1,306.41	-9.80	1,306.44	0.38
4,027.00	92.60	358.90	2,830.41	1,400.30	-11.36	1,400.35	0.38
4,120.00	92.40	358.90	2,826.36	1,493.20	-13.14	1,493.25	0.22
4,214.00	92.50	359.10	2,822.34	1,587.10	-14.78	1,587.16	0.24
4,307.00	92.50	359.00	2,818.28	1,680.00	-16.32	1,680.07	0.11
4,402.00	92.20	359.80	2,814.39	1,774.91	-17.32	1,774.98	0.90
4,496.00	92.20	0.40	2,810.78	1,868.84	-17.15	1,868.91	0.64
4,589.00	92.00	0.30	2,807.37	1,961.78	-16.58	1,961.84	0.24
4,682.00	91.90	0.80	2,804.20	2,054.72	-15.69	2,054.78	0.55
4,776.00	92.00	1.10	2,801.01	2,148.65	-14.13	2,148.70	0.34
4,870.00	91.80	1.00	2,797.89	2,242.58	-12.41	2,242.62	0.24



Phoenix Technology Services

Phoenix Final Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD 27 NME)	TVD Reference:	KB @ 3409.00usft (Silver Oak 3)
Site:	Falabella 31 Fee	MD Reference:	KB @ 3409.00usft (Silver Oak 3)
Well:	#8H	North Reference:	Grid
Wellbore:	WB1/Job #1410177	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR DB

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V-Sec (usft)	DLeg (°/100usft)
	4,964.00	91.70	0.20	2,795.02	2,336.53	-11.43	2,336.56	0.86
	5,057.00	91.90	0.20	2,792.10	2,429.49	-11.10	2,429.51	0.22
	5,151.00	92.20	0.30	2,788.74	2,523.43	-10.69	2,523.44	0.34
	5,245.00	92.20	0.30	2,785.13	2,617.36	-10.20	2,617.37	0.00
	5,339.00	92.20	0.80	2,781.52	2,711.28	-9.30	2,711.29	0.53
	5,433.00	92.00	359.99	2,778.07	2,805.22	-8.65	2,805.22	0.89
	5,526.00	92.00	0.10	2,774.83	2,898.16	-8.58	2,898.16	0.12
	5,621.00	91.70	359.60	2,771.76	2,993.11	-8.83	2,993.11	0.61
	5,715.00	91.80	359.30	2,768.89	3,087.06	-9.73	3,087.06	0.34
	5,810.00	91.90	359.20	2,765.82	3,182.00	-10.97	3,182.01	0.15
	5,904.00	91.90	359.20	2,762.71	3,275.94	-12.29	3,275.96	0.00
	5,998.00	91.80	359.50	2,759.67	3,369.89	-13.35	3,369.91	0.34
	6,092.00	91.80	359.80	2,756.72	3,463.84	-13.93	3,463.86	0.32
	6,185.00	91.40	359.70	2,754.12	3,556.80	-14.33	3,556.82	0.44
	6,279.00	91.70	358.60	2,751.58	3,650.75	-15.73	3,650.78	1.21
	6,372.00	92.00	358.90	2,748.58	3,743.68	-17.75	3,743.72	0.46
	6,466.00	91.90	359.60	2,745.38	3,837.62	-18.98	3,837.66	0.75
	6,559.00	91.80	358.70	2,742.38	3,930.56	-20.36	3,930.61	0.97
	6,652.00	91.70	359.10	2,739.54	4,023.50	-22.15	4,023.56	0.44
	6,746.00	91.40	359.60	2,736.99	4,117.46	-23.21	4,117.52	0.62
	6,840.00	91.90	358.60	2,734.29	4,211.41	-24.69	4,211.48	1.19
	6,933.00	92.40	358.70	2,730.80	4,304.32	-26.88	4,304.40	0.55
	7,027.00	92.30	358.70	2,726.94	4,398.21	-29.01	4,398.31	0.11
	7,121.00	92.60	358.90	2,722.93	4,492.11	-30.97	4,492.21	0.38
	7,214.00	92.80	359.60	2,718.54	4,584.99	-32.19	4,585.11	0.78
	7,308.00	92.50	0.30	2,714.20	4,678.89	-32.27	4,679.00	0.81
	7,402.00	92.30	0.50	2,710.26	4,772.81	-31.62	4,772.91	0.30
	7,421.00	92.40	0.30	2,709.48	4,791.79	-31.48	4,791.89	1.18
Last Phoenix MWD Survey	7,479.00	92.40	0.30	2,707.05	4,849.74	-31.18	4,849.84	0.00
Projection to TD								

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		N/S (usft)	E/W (usft)	
2,190.00	2,189.35	-40.77	27.24	Tie-on to VES Gyro Survey
2,227.00	2,226.34	-41.15	27.53	First Phoenix MWD Survey
7,421.00	2,709.48	4,791.79	-31.48	Last Phoenix MWD Survey
7,479.00	2,707.05	4,849.74	-31.18	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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