Company: COG Operating LLC (Concho)
Lease/Well: Burch Keely Unit / No. 621
Location: 2 Miles from Loco Hills
Rig Name: Silver Oak 5
State/County: New Mexico / Eddy
Latitude: 32.82
GRID North is 0.16 Degrees East of True North
VS-Azi: 0.00 Degrees

30-015-40325

Depth Reference : RKB= 17'

DRILLOG HA GYRO SURVEY CALCULATIONS
Filename: burch keely unit 621.ut
Minimum Curvature Method
Report Date/Time: 8/15/2012 / 08:55

Vaughn Energy Services
Gardendale, Texas
432-563-5444
Surveyor: Chris Tallant
Burch Keely Unit No. 621 / API 30-015-40325

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	0.18	170.43	100.00	-0.15	0.03	0.15	170.43	0.18
200.00	0.12	127.77	200.00	-0.37	0.13	0.39	160.14	0.12
300.00	0.15	132.26	300.00	-0.52	0.31	0.61	148.92	0.04
400.00	0.14	60.44	400.00	-0.55	0.52	0.76	136.55	0.17
500.00	0.20	12.31	500.00	-0.32	0.67	0.74	115.62	0.15
600.00	0.36	13.83	600.00	0.15	0.78	0.79	78.85	0.16
700.00	0.60	16.79	699.99	0.96	1.00	1.39	46.26	0.25
800.00	0.63	36.89	799.99	1.90	1.48	2.41	37.96	0.22
900.00	0.61	44.86	899.98	2.72	2.19	3.49	38.84	0.09
947.00	0.59	39.68	946.98	3.08	2.52	3.98	39.27	0.12

VES Survey Date: 08/07/2012

Silver Oak Drilling

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

August 13, 2012

COG, LLC
Fasken Center, Tower II
550 West Texas Ave, Suite 1300
Midland, TX 79701

RE: Burch Keely Unit #621
2042' FNL & 1531' FWL
Sec. 24, T17S, R29E
Eddy County, New Mexico

Dear Sir,

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

Very truly yours,

C Graham

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 13th day of August, 2012.

Reginia L. Garner
Notary Public

OFFICIAL SEAL
REGINIA L. GARNER
NOTARY PUBLIC - STATE OF NEW MEXICO
My commission expires Aug. 30, 2012

Burch Keely Unit #621

Date	Depth	Dev/Inc	Dir/AZ
8/5/2012	224	0.80	
8/7/2012	474	0.60	
8/7/2012	951	1.30	
8/8/2012	1022	1.14	64.58
8/8/2012	1086	0.88	0.28
8/8/2012	1149	0.35	76.36
8/8/2012	1213	0.53	275.76
8/8/2012	1308	2.29	285.80
8/8/2012	1374	2.29	268.90
8/8/2012	1436	2.99	269.37
8/9/2012	1627	4.92	286.50
8/9/2012	1691	5.39	283.80
8/9/2012	1786	5.10	279.00
8/9/2012	1882	6.25	277.70
8/9/2012	1977	5.45	272.00
8/9/2012	2073	5.45	279.80
8/9/2012	2169	5.28	286.90
8/9/2012	2264	4.94	284.15
8/9/2012	2360	5.54	294.50
8/9/2012	2455	5.69	294.60
8/9/2012	2551	5.36	292.13
8/9/2012	2647	5.19	292.60
8/9/2012	2742	6.42	283.69
8/9/2012	2838	6.60	282.73
8/9/2012	2991	6.42	283.20
8/9/2012	3029	6.42	284.40
8/9/2012	3380	4.31	284.60
8/10/2012	3444	4.92	274.70
8/10/2012	3539	5.85	281.30
8/10/2012	3635	5.63	281.00
8/10/2012	3699	5.30	284.60
8/10/2012	3794	3.78	290.50
8/10/2012	3858	2.90	290.37
8/10/2012	3922	2.20	295.20
8/10/2012	3986	1.41	280.70
8/10/2012	4049	1.14	266.90
8/10/2012	4145	0.26	161.30
8/10/2012	4209	0.62	
8/11/2012	4664	1.30	

CONCHO

COG Operating LLC

Eddy County, NM (NAD27 NME)
Burch Keely Unit
#621
OH - Job #32D0812982

Survey: MWD

SDI Standard Survey Report

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

Notarized this date 21st of August, 2012.

Notary Signature
County of Midland
State of Texas

NOTARY PUBLIC STATE OF TEXAS
CARRIE REED
My Commission Expires
October 4, 2015

Scientific Drilling

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #621
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RF @ 3609.00usft (SO #5)
Site:	Burch Keely Unit	**MD Reference:**	RF @ 3609.00usft (SO #5)
Well:	#621	**North Reference:**	Grid
Wellbore:	OH - Job #32D0812982	**Survey Calculation Method:**	Minimum Curvature
Design:	Actual	**Database:**	EDM-Regulatory

Project Eddy County, NM (NAD27 NME)

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 Burch Keely Unit

Site Position:		**Northing:**	661,490.10 usft	**Latitude:**	32° 49' 5.462 N
From:	Map	**Easting:**	589,648.00 usft	**Longitude:**	104° 2' 29.475 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	0.16 °

Well #621

Well Position	**+N/-S**	0.00 usft	**Northing:**	662,726.90 usft	**Latitude:**	32° 49' 17.614 N
	+E/-W	0.00 usft	**Easting:**	592,763.80 usft	**Longitude:**	104° 1' 52.922 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,597.00 usft

Wellbore OH - Job #32D0812982

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/18/11	7.79	60.65	48,881

Design Actual

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	285.57

Survey Program **Date** 08/20/12

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	947.00	VES Gyro (OH - Job #32D0812982)	UNKNOWN	Unknown survey
1,022.00	4,298.00	MWD (OH - Job #32D0812982)	MWD	MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
947.00	0.59	39.68	946.98	3.08	2.52	39.26	3.98
1,022.00	1.14	64.58	1,021.97	3.70	3.44	42.92	5.05
1,086.00	0.88	68.45	1,085.96	4.15	4.47	47.12	6.10
1,149.00	0.35	76.36	1,148.96	4.37	5.11	49.42	6.72
1,213.00	0.53	275.78	1,212.96	4.45	5.00	48.34	6.70
1,308.00	2.29	285.80	1,307.92	5.01	2.74	28.66	5.71
1,372.00	2.29	268.93	1,371.87	5.34	0.23	2.47	5.34
1,436.00	2.99	269.37	1,435.81	5.29	-2.72	332.83	5.95
1,499.00	3.69	271.92	1,498.70	5.34	-6.39	309.92	8.33
1,563.00	4.39	282.88	1,562.54	5.96	-10.83	298.81	12.36
1,628.16	4.92	286.51	1,627.48	7.31	-15.94	294.63	17.54

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #621
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RF @ 3609.00usft (SO #5)
Site:	Burch Keely Unit	**MD Reference:**	RF @ 3609.00usft (SO #5)
Well:	#621	**North Reference:**	Grid
Wellbore:	OH - Job #32D0812982	**Survey Calculation Method:**	Minimum Curvature
Design:	Actual	**Database:**	EDM-Regulatory

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,692.00	5.39	283.84	1,691.07	8.80	-21.48	292.29	23.21
1,786.00	5.10	279.03	1,784.67	10.52	-29.89	289.38	31.69
1,882.00	6.25	277.76	1,880.20	11.89	-39.28	286.84	41.04
1,977.00	5.45	272.09	1,974.71	12.75	-48.92	284.61	50.55
2,073.00	5.45	279.83	2,070.27	13.70	-57.96	283.30	59.56
2,169.00	5.28	286.94	2,165.85	15.76	-66.68	283.30	68.52
2,264.00	4.94	284.15	2,260.48	18.04	-74.83	283.55	76.97
2,360.00	5.54	294.50	2,356.08	20.97	-83.05	284.17	85.66
2,455.00	5.69	294.60	2,450.62	24.83	-91.51	285.18	94.82
2,551.00	5.36	292.13	2,546.18	28.50	-99.99	285.91	103.97
2,647.00	5.19	292.66	2,641.77	31.86	-108.15	286.42	112.75
2,742.00	6.42	283.69	2,736.28	34.78	-117.28	286.52	122.32
2,838.00	6.60	282.73	2,831.66	37.26	-127.87	286.25	133.19
2,933.00	6.42	283.25	2,926.05	39.68	-138.37	286.00	143.95
3,029.00	6.42	284.40	3,021.45	42.25	-148.79	285.85	154.67
3,157.00	4.48	285.80	3,148.86	45.39	-160.53	285.79	166.83
3,252.00	4.22	284.66	3,243.59	47.28	-167.48	285.77	174.03
3,348.00	4.31	285.80	3,339.32	49.16	-174.37	285.74	181.17
3,444.00	4.92	274.73	3,435.01	50.48	-181.95	285.51	188.82
3,504.00	5.85	281.34	3,494.75	51.29	-187.51	285.30	194.40
3,635.00	5.63	281.06	3,625.09	53.84	-200.36	285.04	207.47
3,699.00	5.30	284.66	3,688.80	55.19	-206.30	284.98	213.56
3,793.00	3.78	290.55	3,782.50	57.38	-213.40	285.05	220.98
3,858.00	2.90	290.55	3,847.39	58.71	-216.95	285.14	224.75
3,922.00	2.20	295.21	3,911.33	59.80	-219.58	285.23	227.57
3,986.00	1.41	280.70	3,975.30	60.47	-221.46	285.27	229.57
4,010.69	1.30	276.01	3,999.98	60.55	-222.04	285.25	230.15
TG1-BK #621							
4,049.00	1.14	266.99	4,038.28	60.58	-222.85	285.21	230.94
4,145.00	0.26	161.88	4,134.28	60.32	-223.74	285.09	231.73
4,240.00	0.62	88.22	4,229.27	60.13	-223.16	285.08	231.12
Last MWD Survey							
4,298.00	0.62	88.22	4,287.27	60.15	-222.53	285.13	230.51
Projection to Bit - PBHL-BK #621							

Survey Annotations

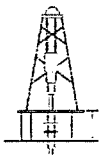
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
4,240.00	4,229.27	60.13	-223.16	Last MWD Survey
4,298.00	4,287.27	60.15	-222.53	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____

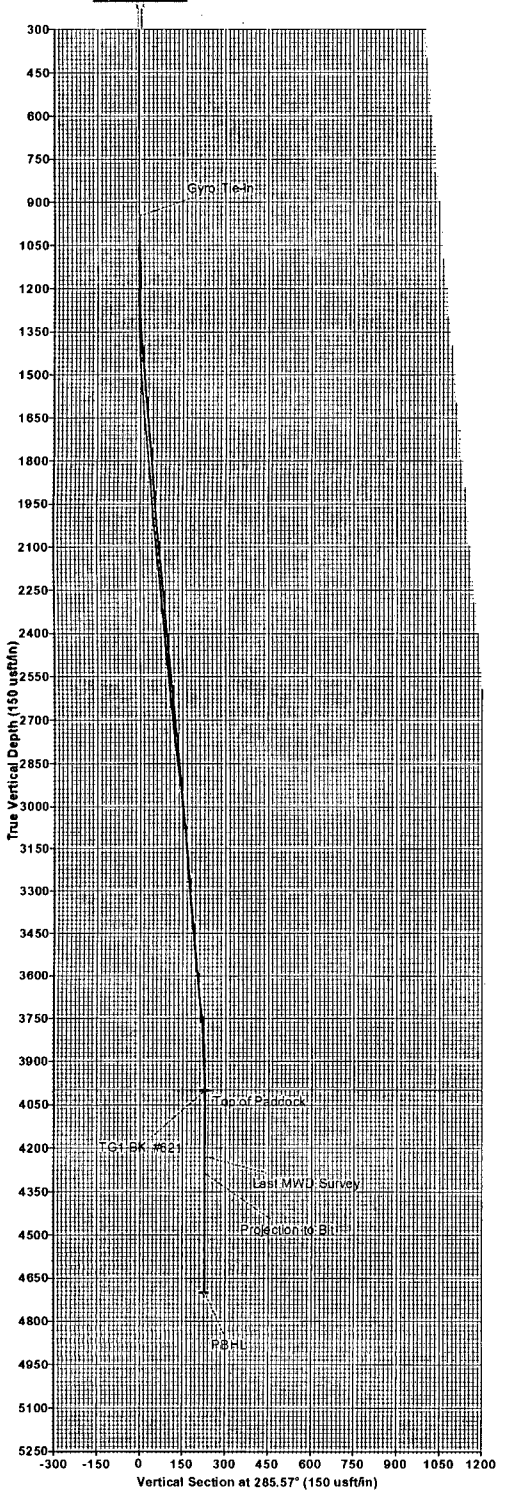
CONCHO

Scientific Drilling

Burch Keely Unit #621
Eddy County, NM (NAN27 NME)
Northing: 662726.90
Easting: 592763.80
Plan #3 vs Actual 7-7/8" Hole



RF @ 3609.00usft (SO #5)
Ground Level: 3597.00



To convert Magnetic North to Grid, Add 7.63°
To convert True North to Grid, Subtract 0.16°

Azimuths to Grid North
True North: -0.16°
Magnetic North: 7.63°

Magnetic Field
Strength: 48881.1snT
Dip Angle: 60.65°
Date: 11/18/2011
Model: IGRF2010

WELL DETAILS:

Ground Level: 3597.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	662726.90	592763.80	32° 49' 17.614 N	104° 1' 52.922 W

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
947.00	0.59	39.68	946.98	3.08	2.52	0.00	0.00	-1.60	
1150.00	0.59	39.68	1149.97	4.69	3.85	0.00	0.00	-2.45	
1421.22	5.14	283.89	1420.84	8.68	-7.06	2.00	-121.40	9.13	
3753.03	5.14	283.89	3743.26	58.84	-209.93	0.00	0.00	218.02	
4010.11	0.00	0.00	4000.00	61.60	-221.12	2.00	180.00	229.54	TG1
4710.11	0.00	0.00	4700.00	61.60	-221.12	0.00	0.00	229.54	PBHL

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
TG1-BK #621	4000.00	61.60	-221.12	662788.50	592542.70
PBHL-BK #621	4700.00	61.60	-221.12	662788.50	592542.70

SITE DETAILS: Burch Keely Unit
Site Centre Northing: 661490.10
Easting: 589648.00

Positional Uncertainty: 0.00
Convergence: 0.16
Local North: Grid

PROJECT DETAILS: Eddy County, NM (NAN27 NME)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001

System Datum: Mean Sea Level

CASING DETAILS

TVD	MD	Name	Size
	1050.00	8-5/8" Casing	8-5/8

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4000.00	4010.11	Top of Paddock

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

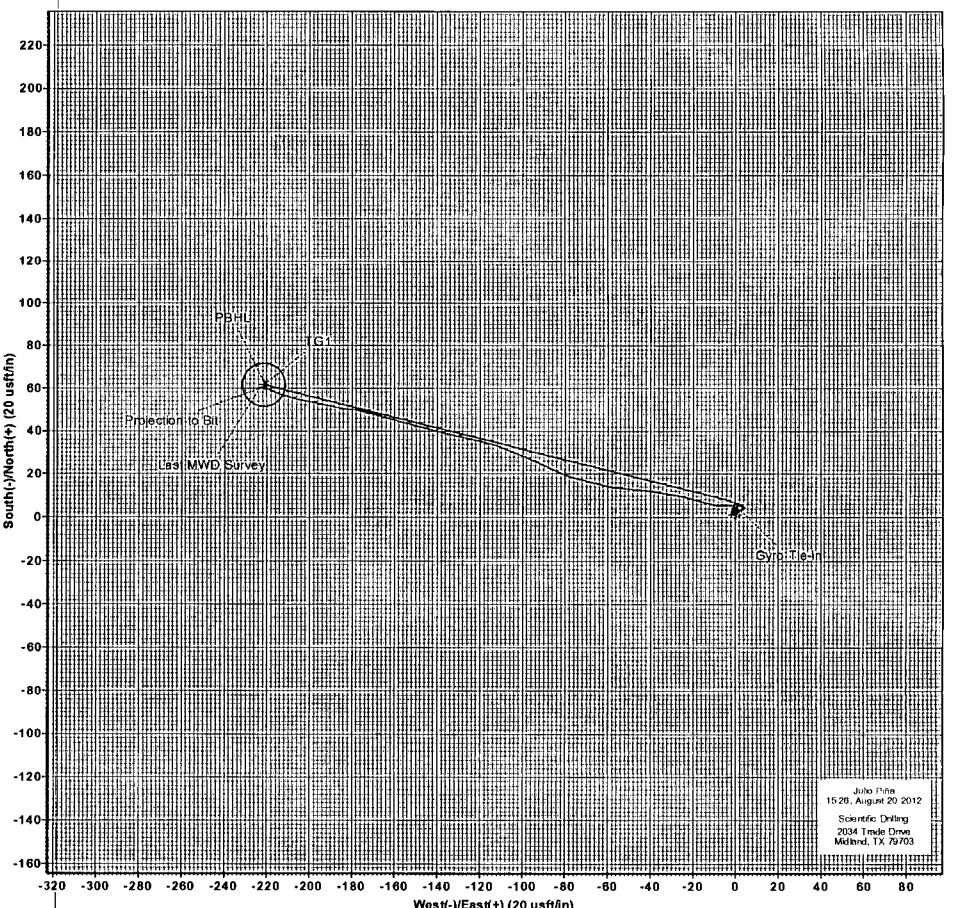
Local Origin: Well #621, Grid North

Latitude: 32° 49' 17.614 N
Longitude: 104° 1' 52.922 W

Grid East: 592763.80
Grid North: 662726.90
Scale Factor: 1.000

Geomagnetic Model: IGRF2010
Sample Date: 18-Nov-11
Magnetic Declination: 7.79°
Dip Angle from Horizontal: 60.65°
Magnetic Field Strength: 48881

To convert Magnetic North to Grid, Add 7.63°
To convert Magnetic North to True North, Add 7.79° East
To convert True North to Grid, Subtract 0.16°



Julio Pina
15:26, August 20 2012
Scientific Drilling
2034 Trade Drive
Midland, TX 79703