



October 9, 2014

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

Attn: Kanicia Castillo

30-015-40706

Re: Burch Keely Unit 788

Please find enclosed a copy of the survey from 0' to 989' 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,

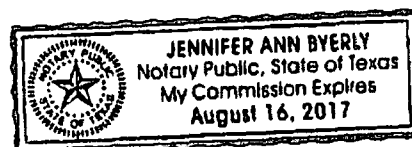
A handwritten signature in black ink, appearing to be "KH", written over a horizontal line.

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 9 day of October, A.D., 2014, by Keith Havelka.

A handwritten signature in black ink, appearing to be "Jennifer Ann Byerly", written over a horizontal line.
Jennifer Byerly
Notary Public, State of Texas





Company: COG Operating LLC
Lease/Well: Burch Keely Unit/788
Location: Sec 19 T17S R30E
Rig Name: Basic 38
State/County: New Mexico/Eddy
Latitude: 32.82, Longitude: -104.00
GRID North is 0.18 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB = 13 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 10/9/2014 / 10:53

VES Survey International
Midland, Texas
432-563-5444
Surveyor: Noe Garza
Burch Keely Unit 788 / API 30-015-40706

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	0.15	66.01	100.00	0.05	0.12	0.05	0.13	66.01	0.15
200.00	0.17	270.30	200.00	0.11	0.09	0.11	0.14	38.85	0.31
300.00	0.30	235.75	300.00	-0.04	-0.28	-0.04	0.28	262.21	0.18
400.00	0.26	295.83	400.00	-0.08	-0.69	-0.08	0.70	263.05	0.28
500.00	0.19	323.07	500.00	0.15	-1.00	0.15	1.01	278.47	0.12
600.00	0.39	353.30	600.00	0.62	-1.14	0.62	1.30	298.57	0.24
700.00	0.40	347.43	699.99	1.30	-1.26	1.30	1.81	315.95	0.04
800.00	0.51	60.95	799.99	1.86	-0.94	1.86	2.08	333.06	0.55
900.00	1.56	53.25	899.97	2.89	0.54	2.89	2.94	10.54	1.06
989.00	1.68	50.05	988.94	4.45	2.51	4.45	5.11	29.42	0.17

OPERATOR COG Operating
WELL/LEASE Burch Keely Unit #788
COUNTY Eddy Co., NM

STATE OF NEW MEXICO
DEVIATION REPORT

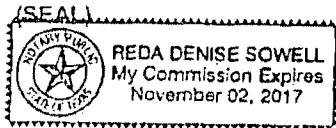
462	0.64
897	1.80
1155	1.60
1194	1.50
1408	1.20
1503	1.50
1598	1.90
1693	2.10
1914	1.80
2009	1.90
2104	2.00
2294	1.80
2484	1.80
2674	1.90
3053	1.70
3243	1.60
3433	1.70
3623	1.00
3813	1.40
3846	1.50
4004	5.80
4194	10.60
4384	11.30
4573	11.80
4668	11.90
4705	12.00

SIGNED BY: 

RON SCANDOLARI, VP-CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 10 DAY OF October, 2014, BEFORE ME, R SOWELL, A NOTARY
PUBLIC, PERSONALLY APPEARED RON SCANDOLARI, WHO ACKNOWLEDGED AND EXECUTED
THIS DOCUMENT. WITNESS MY HAND AND OFFICIAL SEAL.



Reda Denise Sowell
NOTARY PUBLIC



COG Operating LLC

Eddy County, NM (NAD27 NME)

Burch Keely Unit

#788

WB1 / Job #1411824

Design: Survey (Basic 38)

Standard Survey Report

03 October, 2014



PHOENIX
TECHNOLOGY SERVICES



Phoenix
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #788
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3640.00usft (Basic 38)
Site:	Burch Keely Unit	MD Reference:	KB @ 3640.00usft (Basic 38)
Well:	#788	North Reference:	Grid
Wellbore:	WB1 / Job #1411824	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Basic 38)	Database:	Compass 5000 GCR DB

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:	Northings:	666,591.10 usft	Latitude: 32° 49' 55.74916 N
From: Map	Easting:	596,305.50 usft	Longitude: 104° 1' 11.28420 W
Position Uncertainty:	0.00 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.17 °

Well:	#788		
Well Position	+N-S	0.00 usft	Northings: 661,736.10 usft
	+E-W	0.00 usft	Easting: 601,438.10 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
			Ground Level: 3,628.00 usft

Wellbore:	WB1 / Job #1411824		
Magnetics:	Model Name	Sample Date	Declination
	IGRF2010_14	9/23/2014	7.43
			Dip Angle
			60.58
			Field Strength
			48,597

Design:	Survey (Basic 38)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			324.17

Survey Program	Date 10/3/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	989.00	VES Gyro Survey (WB1 / Job #1411824)	VES-ISCWSA-GYRO-3
1,155.00	4,768.00	Phoenix MWD Survey (WB1 / Job #14118)	PHX+MWD+IGRF
			Description
			Biaxial Semi-Cont. Gyro
			PHX+MWD+IGRF v3 standard declination

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.15	66.01	100.00	0.05	0.12	-0.03	0.15	0.15	0.00
200.00	0.17	270.30	200.00	0.11	0.09	0.03	0.31	0.02	-155.71
300.00	0.30	235.75	300.00	-0.04	-0.27	0.13	0.19	0.13	-34.55
400.00	0.26	295.83	400.00	-0.09	-0.69	0.34	0.28	-0.04	60.08
500.00	0.19	323.07	500.00	0.14	-1.00	0.70	0.13	-0.07	27.24
600.00	0.39	353.30	600.00	0.61	-1.14	1.16	0.25	0.20	30.23
700.00	0.40	347.43	699.99	1.29	-1.25	1.78	0.04	0.01	-5.87
800.00	0.51	60.95	799.99	1.85	-0.94	2.05	0.55	0.11	73.52
900.00	1.56	53.25	899.97	2.88	0.54	2.02	1.06	1.05	-7.70



Phoenix
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #788
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3640.00usft (Basic 38)
Site:	Burch Keely Unit	MD Reference:	KB @ 3640.00usft (Basic 38)
Well:	#788	North Reference:	Grid
Wellbore:	WB1 / Job #1411824	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Basic 38)	Database:	Compass 5000 GCR DB

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N-S (usft)	E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
989.00	1.68	50.05	988.94	4.44	2.51	2.13	0.17	0.13	-3.60
Tie-on to VES Gyro Survey									
1,155.00	1.60	55.40	1,154.87	7.32	6.28	2.26	0.10	-0.05	3.22
First Phoenix MWD Survey									
1,194.00	1.50	54.10	1,193.86	7.93	7.14	2.25	0.27	-0.26	-3.33
1,250.00	1.20	63.10	1,249.84	8.62	8.26	2.16	0.65	-0.54	16.07
1,313.00	1.10	50.40	1,312.83	9.31	9.32	2.09	0.43	-0.16	-20.16
1,377.00	1.20	26.90	1,376.82	10.30	10.09	2.44	0.75	0.16	-36.72
1,440.00	1.20	19.70	1,439.80	11.51	10.61	3.12	0.24	0.00	-11.43
1,503.00	1.50	16.90	1,502.78	12.92	11.08	3.99	0.49	0.48	-4.44
1,567.00	1.90	336.70	1,566.76	14.69	10.90	5.53	1.92	0.63	-62.81
1,661.00	2.20	334.90	1,660.70	17.76	9.52	8.83	0.33	0.32	-1.91
1,725.00	1.80	321.70	1,724.66	19.66	8.37	11.04	0.95	-0.63	-20.63
1,819.00	2.00	316.50	1,818.61	22.01	6.33	14.14	0.28	0.21	-5.53
1,914.00	1.80	335.40	1,913.56	24.57	4.57	17.24	0.69	-0.21	19.89
2,009.00	1.90	335.30	2,008.51	27.35	3.29	20.25	0.11	0.11	-0.11
2,105.00	2.00	311.50	2,104.45	29.91	1.37	23.45	0.84	0.10	-24.79
2,200.00	2.20	324.80	2,199.39	32.50	-0.92	26.89	0.55	0.21	14.00
2,295.00	1.80	324.90	2,294.33	35.21	-2.83	30.21	0.42	-0.42	0.11
2,390.00	1.90	336.00	2,389.28	37.87	-4.33	33.24	0.39	0.11	11.68
2,485.00	1.80	338.80	2,484.23	40.70	-5.51	36.22	0.14	-0.11	2.95
2,579.00	1.80	337.50	2,578.19	43.44	-6.61	39.09	0.04	0.00	-1.38
2,674.00	1.90	341.80	2,673.14	46.31	-7.67	42.04	0.18	0.11	4.53
2,864.00	1.50	337.80	2,863.05	51.61	-9.60	47.46	0.22	-0.21	-2.11
2,959.00	1.60	336.70	2,958.02	53.98	-10.59	49.96	0.11	0.11	-1.16
3,054.00	1.70	334.80	3,052.98	56.47	-11.72	52.64	0.12	0.11	-2.00
3,149.00	1.80	330.40	3,147.93	59.04	-13.05	55.51	0.18	0.11	-4.63
3,243.00	1.60	332.00	3,241.89	61.49	-14.40	58.28	0.22	-0.21	1.70
3,338.00	1.80	336.20	3,336.85	64.02	-15.62	61.05	0.25	0.21	4.42
3,433.00	1.70	331.60	3,431.81	66.63	-16.90	63.91	0.18	-0.11	-4.84
3,528.00	0.90	334.00	3,526.78	68.54	-17.89	66.04	0.84	-0.84	2.53
3,624.00	1.00	324.40	3,622.77	69.90	-18.71	67.62	0.20	0.10	-10.00
3,718.00	1.50	342.50	3,716.75	71.74	-19.56	69.61	0.67	0.53	19.26
3,813.00	1.40	343.70	3,811.72	74.04	-20.26	71.88	0.11	-0.11	1.26
3,907.00	3.30	285.20	3,905.64	75.85	-23.19	75.07	3.01	2.02	-62.23
4,002.00	5.80	283.50	4,000.34	77.69	-30.50	80.84	2.64	2.63	-1.79
4,097.00	9.40	288.50	4,094.49	81.27	-42.53	90.78	3.85	3.79	5.26
4,192.00	10.60	285.00	4,188.04	85.99	-58.33	103.86	1.42	1.26	-3.68
4,287.00	10.50	283.90	4,281.44	90.33	-75.17	117.24	0.24	-0.11	-1.16
4,382.00	11.30	282.90	4,374.72	94.49	-92.64	130.84	0.87	0.84	-1.05
4,477.00	11.80	282.50	4,467.80	98.67	-111.20	145.09	0.53	0.53	-0.42
4,572.00	11.80	283.20	4,560.79	102.99	-130.14	159.68	0.15	0.00	0.74
4,667.00	11.90	282.20	4,653.77	107.28	-149.17	174.30	0.24	0.11	-1.05



Phoenix
Survey Report



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Well:	#788	North Reference:	Grid
Wellbore:	WB1 / Job #1411824	Survey Calculation Method:	Minimum Curvature
Design:	Survey (Basic 38)	Database:	Compass 5000 GCR 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)
4,718.00	12.00	281.40	4,703.66	109.44	-159.51	182.10	0.38	0.20	-1.57
Last Phoenix MWD Survey									
4,768.00	12.00	281.40	4,752.57	111.49	-169.70	189.73	0.00	0.00	0.00
Projection to Bit									

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
989.00	988.94	4.44	2.51	Tie-on to VES Gyro Survey
1,155.00	1,154.87	7.32	6.28	First Phoenix MWD Survey
4,718.00	4,703.66	109.44	-159.51	Last Phoenix MWD Survey
4,768.00	4,752.57	111.49	-169.70	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____