



15-40706

October 9, 2014

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

NM OIL CONSERVATION
ARTESTA DISTRICT
NOV 17 2014
RECEIVED

Attn: Kanicia Castillo

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.

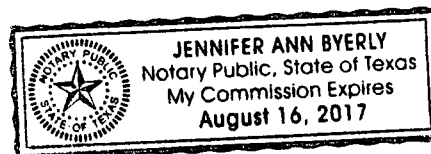
Sincerely,

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.

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

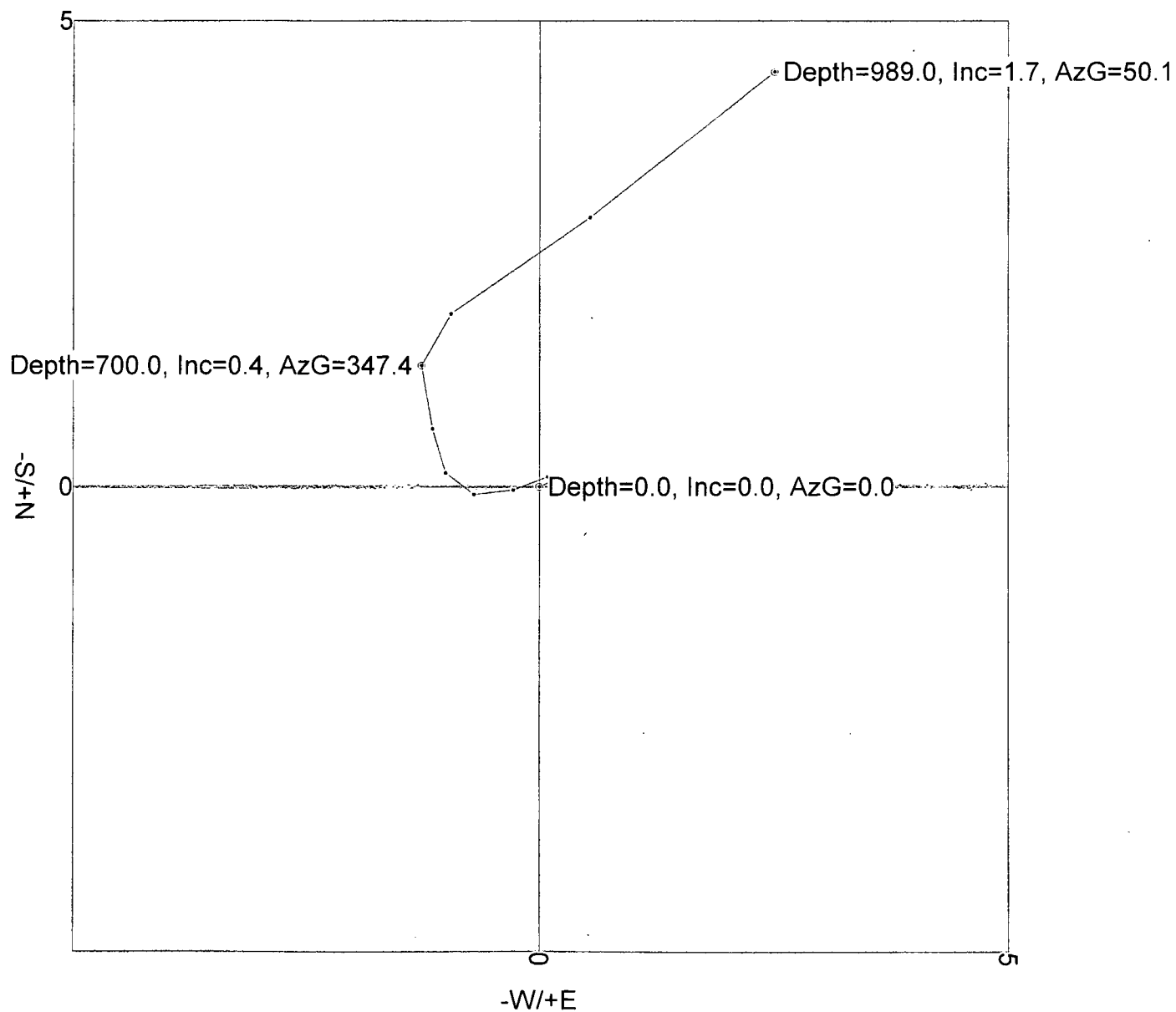
Surveyor: Noe Garza

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



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



VES Survey Date: 09/29/2014

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

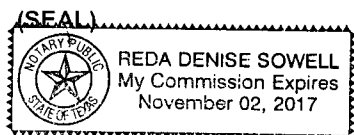
STATE OF NEW MEXICO
DEVIATION REPORT

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
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:		Northing:	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	Northing:	661,736.10 usft	Latitude:	32° 49' 7.55297 N
	+E/-W	0.00 usft	Easting:	601,438.10 usft	Longitude:	104° 0' 11.30791 W
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 (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	9/23/2014	7.43	60.58	48,597

Design:	Survey (Basic 38)				
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	324.17	

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

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)	
0.00	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.GCRDB

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)
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



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

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)
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									

Design Annotations				
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: _____