



30 015 42761

I JAVIER ESTRADA certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 08/13/15 through 08/13/15 conduct or supervise the taking of a RATE GYRO survey from a depth of 0 feet to a depth of 4248 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of COG OPERATING for the BURCH KEELY UNIT No Well # 931H API # 30-015-42761 in EDDY County / Parish NEW MEXICO; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Vaughn Energy Services


JAVIER ESTRADA
Service Technician
Vaughn Energy Services



August 19, 2015

NM OIL CONSERVATION
ARTESIA DISTRICT

DEC 07 2015

RECEIVED

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

NM OIL CONSERVATION
ARTESIA DISTRICT

DEC 07 2015

RECEIVED

Attn: Kanicia Castillo

RE: **Burch Keely Unit No 931H**

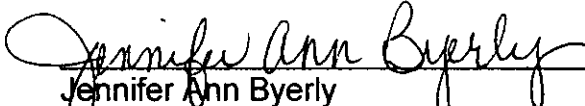
Please find enclosed a copy of the survey from 0' to 4248' ran on the above referenced well.

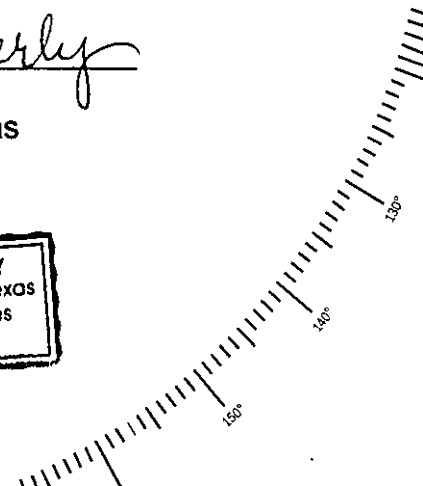
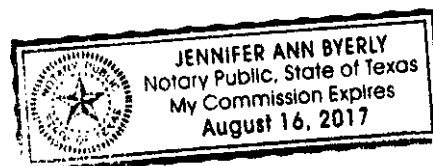
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 19 day of August,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Cog Operating LLC
Lease/Well: Burch Keely Unit No/931H



Rig Name: UDI 43
State/Country: New Mexico /Eddy
VS-Azi: 0.00 Degrees
Latitude: 32.83942, Longitude: -104.03536
Grid North = True North -0.16 degs (NAD 27)

NM OIL CONSERVATION
ARTESIA DISTRICT
DEC 07 2015
RECEIVED

Depth Reference : R.K.B = 12.5 Ft

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: burch keely unit 931h -de_01.ut

Minimum Curvature Method

Report Date/Time: 8/19/2015 / 15:23

VES Survey International
Midland, Texas
432-563-5444

Surveyor: Javier Estrada

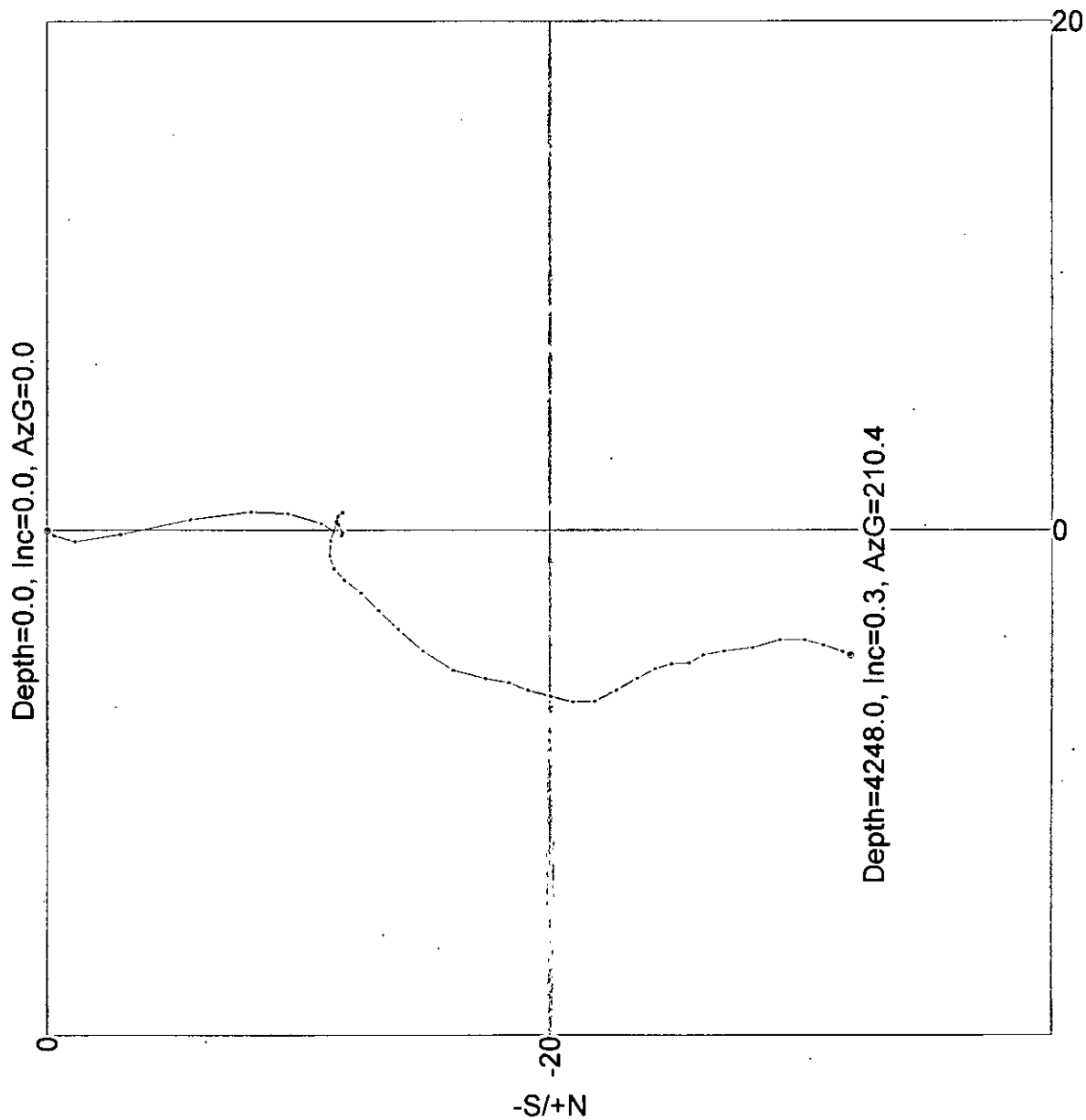
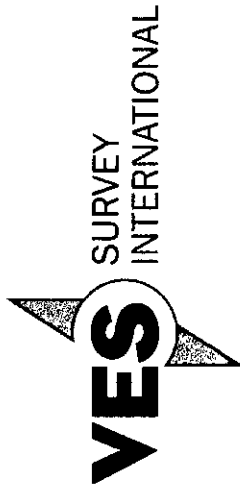
Burch Keely Unit No 931H / API 30-015-42761

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	0.42	219.03	100.00	-0.28	-0.23	-0.28	0.37	219.03	0.42
200.00	0.65	180.23	199.99	-1.13	-0.46	-1.13	1.23	202.19	0.42
300.00	1.45	166.93	299.98	-2.94	-0.18	-2.94	2.94	183.48	0.83
400.00	1.81	169.32	399.94	-5.72	0.40	-5.72	5.74	176.00	0.36
500.00	0.97	179.59	499.91	-8.13	0.70	-8.13	8.16	175.08	0.87
600.00	0.70	186.00	599.90	-9.58	0.64	-9.58	9.61	176.17	0.29
700.00	0.90	203.95	699.89	-10.91	0.26	-10.91	10.92	178.65	0.32
800.00	0.22	240.63	799.88	-11.73	-0.23	-11.73	11.73	181.14	0.74
900.00	0.33	78.22	899.88	-11.77	-0.12	-11.77	11.77	180.59	0.55
1000.00	0.14	23.80	999.88	-11.60	0.21	-11.60	11.60	178.96	0.27
1100.00	0.08	106.00	1099.88	-11.51	0.33	-11.51	11.51	178.38	0.15
1200.00	0.17	110.00	1199.88	-11.58	0.54	-11.58	11.59	177.35	0.09
1300.00	0.17	173.69	1299.88	-11.78	0.69	-11.78	11.80	176.63	0.18
1400.00	0.17	340.41	1399.88	-11.79	0.66	-11.79	11.81	176.79	0.34
1500.00	0.39	290.21	1499.88	-11.53	0.29	-11.53	11.53	178.56	0.31
1600.00	0.48	286.63	1599.87	-11.29	-0.43	-11.29	11.30	182.18	0.09
1700.00	0.24	248.02	1699.87	-11.25	-1.02	-11.25	11.30	185.18	0.33
1800.00	0.38	252.96	1799.87	-11.43	-1.53	-11.43	11.53	187.62	0.15

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	0.39	203.37	1899.87	-11.84	-1.98	-11.84	12.00	189.50	0.32
2000.00	0.57	225.61	1999.87	-12.50	-2.48	-12.50	12.75	191.20	0.26
2100.00	0.55	224.84	2099.86	-13.19	-3.17	-13.19	13.57	193.51	0.03
2200.00	0.68	222.81	2199.86	-13.97	-3.91	-13.97	14.51	195.65	0.14
2300.00	0.81	219.61	2299.85	-14.95	-4.77	-14.95	15.69	197.69	0.14
2400.00	0.83	204.65	2399.84	-16.16	-5.52	-16.16	17.07	198.87	0.21
2500.00	0.72	182.11	2499.83	-17.45	-5.85	-17.45	18.40	198.53	0.32
2600.00	0.38	206.00	2599.82	-18.37	-6.02	-18.37	19.33	198.13	0.41
2700.00	0.55	198.11	2699.82	-19.13	-6.31	-19.13	20.14	198.26	0.18
2800.00	0.53	191.38	2799.82	-20.03	-6.55	-20.03	21.07	198.11	0.07
2900.00	0.53	194.79	2899.81	-20.93	-6.76	-20.93	21.99	197.90	0.03
3000.00	0.51	163.05	2999.81	-21.80	-6.75	-21.80	22.82	197.19	0.28
3100.00	0.60	143.66	3099.80	-22.65	-6.31	-22.65	23.51	195.56	0.20
3200.00	0.51	159.62	3199.80	-23.48	-5.84	-23.48	24.20	193.97	0.18
3300.00	0.41	142.43	3299.79	-24.18	-5.47	-24.18	24.79	192.75	0.17
3400.00	0.42	183.01	3399.79	-24.83	-5.27	-24.83	25.39	191.98	0.29
3500.00	0.38	171.91	3499.79	-25.53	-5.24	-25.53	26.07	191.60	0.09
3600.00	0.41	129.82	3599.79	-26.10	-4.92	-26.10	26.56	190.68	0.29
3700.00	0.72	191.56	3699.78	-26.94	-4.77	-26.94	27.36	190.04	0.64
3800.00	0.67	153.30	3799.78	-28.07	-4.63	-28.07	28.45	189.37	0.46
3900.00	0.66	174.49	3899.77	-29.17	-4.32	-29.17	29.48	188.42	0.24
4000.00	0.46	189.80	3999.77	-30.14	-4.33	-30.14	30.45	188.17	0.25
4100.00	0.44	199.60	4099.76	-30.90	-4.53	-30.90	31.23	188.33	0.08
4200.00	0.51	196.27	4199.76	-31.69	-4.78	-31.69	32.05	188.58	0.08
4248.00	0.31	210.38	4247.76	-32.01	-4.91	-32.01	32.38	188.71	0.46



VES Survey International
Midland, Texas
432-563-5444
Surveyor: Javier Estrada
Burch Keely Unit No 931H / API 30-015-42761



-W/+E

V.E.S. Survey Date: 8/13/2015



COG Operating LLC

Eddy County, NM

Burch Keely Unit #931H

SHL: 820' FNL, 300' FWL, Sec 13, T17S, R29E, Unit D

BHL: 950' FNL, 472' FWL, Sec 18, T17S, R30E, Lot 1

Design: BHL: 950' FNL, 472' FWL, Sec 18, T17S, R30E, Lot 1

Standard Survey Report

19 August, 2015





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #931H
Project:	Eddy County, NM	TVD Reference:	KB @ 3647.00usft
Site:	Burch Keely Unit #931H	MD Reference:	KB @ 3647.00usft
Well:	SHL: 820' FNL, 300' FWL, Sec 13, T17S, R29E, Unit D	North Reference:	Grid
Wellbore:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 1	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 1	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM		
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 #931H			
Site Position:		Northing:	669,222.90 usft	Latitude: 32° 50' 21.929 N
From:	Map	Easting:	591,518.10 usft	Longitude: 104° 2' 7.306 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.16 °

Well	SHL: 820' FNL, 300' FWL, Sec 13, T17S, R29E, Unit D			
Well Position	+N/-S	0.00 usft	Northing:	669,222.90 usft
	+E/-W	0.00 usft	Easting:	591,518.10 usft
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft
			Ground Level:	3,635.00 usft

Wellbore	BHL: 950' FNL, 472' FWL, Sec 18, T17S, R30E, Lot 1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/23/2015	7.42	60.58	48,449

Design	BHL: 950' FNL, 472' FWL, Sec 18, T17S, R30E, Lot 1			
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	91.43

Survey Program	Date 8/19/2015				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	4,248.00	Gyro #1 (BHL: 970' FNL, 477' FWL, Sec 18	NS-GYRO-SS	NS Gyro single shots	
4,327.00	10,160.00	MWD #1 (BHL: 970' FNL, 477' FWL, Sec 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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.42	219.03	100.00	-0.28	-0.23	-0.22	0.42	0.42	0.00
200.00	0.65	180.23	199.99	-1.14	-0.46	-0.44	0.42	0.23	-38.80
300.00	1.45	166.93	299.98	-2.94	-0.18	-0.11	0.83	0.80	-13.30
400.00	1.81	169.32	399.94	-5.72	0.40	0.54	0.37	0.36	2.39
500.00	0.97	179.59	499.91	-8.12	0.70	0.90	0.87	-0.84	10.27
600.00	0.70	186.00	599.90	-9.57	0.64	0.88	0.29	-0.27	6.41

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #931H
Project:	Eddy County, NM	TVD Reference:	KB @ 3647.00usft
Site:	Burch Keely Unit #931H	MD Reference:	KB @ 3647.00usft
Well:	SHL: 820' FNL, 300' FWL, Sec 13, T17S, R29E, Unit D	North Reference:	Grid
Wellbore:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 1	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 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)	
700.00	0.90	203.95	699.89	-10.90	0.26	0.53	0.32	0.20	17.95	
800.00	0.22	240.63	799.88	-11.71	-0.23	0.06	0.74	-0.68	36.68	
900.00	0.33	78.22	899.88	-11.75	-0.11	0.18	0.54	0.11	-162.41	
1,000.00	0.14	23.80	999.88	-11.57	0.22	0.51	0.27	-0.19	-54.42	
1,100.00	0.08	106.00	1,099.88	-11.48	0.33	0.62	0.15	-0.06	82.20	
1,200.00	0.17	110.00	1,199.88	-11.55	0.54	0.83	0.09	0.09	4.00	
1,300.00	0.17	173.69	1,299.88	-11.75	0.70	0.99	0.18	0.00	63.69	
1,400.00	0.17	340.41	1,399.88	-11.76	0.66	0.96	0.34	0.00	166.72	
1,500.00	0.39	290.21	1,499.88	-11.50	0.29	0.58	0.31	0.22	-50.20	
1,600.00	0.48	286.63	1,599.88	-11.26	-0.43	-0.15	0.09	0.09	-3.58	
1,700.00	0.24	248.02	1,699.87	-11.22	-1.02	-0.74	0.33	-0.24	-38.61	
1,800.00	0.38	252.96	1,799.87	-11.40	-1.53	-1.25	0.14	0.14	4.94	
1,900.00	0.39	203.37	1,899.87	-11.81	-1.99	-1.69	0.32	0.01	-49.59	
2,000.00	0.57	225.61	1,999.87	-12.47	-2.48	-2.17	0.26	0.18	22.24	
2,100.00	0.55	224.84	2,099.86	-13.16	-3.17	-2.84	0.02	-0.02	-0.77	
2,200.00	0.68	222.81	2,199.86	-13.93	-3.91	-3.56	0.13	0.13	-2.03	
2,300.00	0.81	219.61	2,299.85	-14.91	-4.77	-4.39	0.14	0.13	-3.20	
2,400.00	0.83	204.65	2,399.84	-16.11	-5.52	-5.12	0.21	0.02	-14.96	
2,500.00	0.72	182.11	2,499.83	-17.40	-5.84	-5.41	0.32	-0.11	-22.54	
2,600.00	0.38	206.00	2,599.82	-18.33	-6.01	-5.55	0.40	-0.34	23.89	
2,700.00	0.55	198.11	2,699.82	-19.08	-6.31	-5.83	0.18	0.17	-7.89	
2,800.00	0.53	191.38	2,799.82	-19.99	-6.55	-6.05	0.07	-0.02	-6.73	
2,900.00	0.53	194.79	2,899.81	-20.89	-6.76	-6.23	0.03	0.00	3.41	
3,000.00	0.51	163.05	2,999.81	-21.76	-6.75	-6.20	0.29	-0.02	-31.74	
3,100.00	0.60	143.66	3,099.80	-22.61	-6.31	-5.74	0.21	0.09	-19.39	
3,200.00	0.51	159.62	3,199.80	-23.45	-5.84	-5.25	0.18	-0.09	15.96	
3,300.00	0.41	142.43	3,299.80	-24.15	-5.47	-4.86	0.17	-0.10	-17.19	
3,400.00	0.42	183.01	3,399.79	-24.80	-5.27	-4.65	0.29	0.01	40.58	
3,500.00	0.38	171.91	3,499.79	-25.49	-5.24	-4.60	0.09	-0.04	-11.10	
3,600.00	0.41	129.82	3,599.79	-26.05	-4.92	-4.27	0.29	0.03	-42.09	
3,700.00	0.72	191.56	3,699.78	-26.90	-4.77	-4.10	0.64	0.31	61.74	
3,800.00	0.67	153.30	3,799.78	-28.03	-4.63	-3.93	0.46	-0.05	-38.26	
3,900.00	0.66	174.49	3,899.77	-29.13	-4.32	-3.59	0.24	-0.01	21.19	
4,000.00	0.46	189.80	3,999.77	-30.10	-4.33	-3.58	0.25	-0.20	15.31	
4,100.00	0.44	199.60	4,099.76	-30.86	-4.53	-3.75	0.08	-0.02	9.80	
4,200.00	0.51	196.27	4,199.76	-31.65	-4.78	-3.99	0.08	0.07	-3.33	
4,248.00	0.31	210.38	4,247.76	-31.96	-4.91	-4.11	0.46	-0.42	29.40	
TIE-IN to VES Gyro										
4,327.00	0.40	218.50	4,326.76	-32.36	-5.18	-4.38	0.13	0.11	10.28	
4,360.00	0.40	219.20	4,359.76	-32.54	-5.33	-4.52	0.01	0.00	2.12	
4,392.00	1.30	125.30	4,391.75	-32.84	-5.10	-4.28	4.33	2.81	-293.44	
4,423.00	4.10	112.70	4,422.72	-33.47	-3.79	-2.96	9.18	9.03	-40.65	



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #931H
Project:	Eddy County, NM	TVD Reference:	KB @ 3647.00usft
Site:	Burch Keely Unit #931H	MD Reference:	KB @ 3647.00usft
Well:	SHL: 820' FNL, 300' FWL, Sec 13, T17S, R29E, Unit D	North Reference:	Grid
Wellbore:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 1	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 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)
4,456.00	7.80	105.30	4,455.53	-34.52	-0.54	0.32	11.43	11.21	-22.42
4,488.00	11.60	98.80	4,487.07	-35.58	4.73	5.62	12.34	11.88	-20.31
4,520.00	15.60	95.20	4,518.17	-36.46	12.20	13.11	12.77	12.50	-11.25
4,551.00	19.70	95.20	4,547.70	-37.32	21.56	22.48	13.23	13.23	0.00
4,582.00	23.50	95.70	4,576.52	-38.40	32.92	33.86	12.27	12.26	1.61
4,614.00	26.80	96.80	4,605.48	-39.89	46.43	47.41	10.42	10.31	3.44
4,646.00	29.50	98.20	4,633.69	-41.87	61.40	62.42	8.69	8.44	4.38
4,678.00	32.00	99.70	4,661.19	-44.42	77.55	78.64	8.17	7.81	4.69
4,710.00	34.90	101.00	4,687.89	-47.60	94.90	96.06	9.33	9.06	4.06
4,742.00	37.80	101.00	4,713.66	-51.22	113.52	114.76	9.06	9.06	0.00
4,775.00	40.90	101.00	4,739.18	-55.21	134.05	135.39	9.39	9.39	0.00
4,807.00	44.00	101.00	4,762.79	-59.33	155.25	156.69	9.69	9.69	0.00
4,839.00	47.50	101.60	4,785.11	-63.82	177.73	179.26	11.02	10.94	1.88
4,871.00	51.30	102.00	4,805.93	-68.79	201.50	203.16	11.91	11.88	1.25
4,903.00	54.60	101.80	4,825.21	-74.06	226.49	228.27	10.32	10.31	-0.63
4,935.00	57.50	101.60	4,843.08	-79.44	252.48	254.39	9.08	9.06	-0.63
4,967.00	60.20	101.70	4,859.63	-84.97	279.30	281.34	8.44	8.44	0.31
5,000.00	63.30	101.60	4,875.25	-90.84	307.77	309.94	9.40	9.39	-0.30
5,032.00	66.30	101.50	4,888.87	-96.64	336.13	338.44	9.38	9.38	-0.31
5,064.00	69.20	101.50	4,900.99	-102.54	365.15	367.60	9.06	9.06	0.00
5,096.00	72.00	101.20	4,911.62	-108.48	394.74	397.33	8.79	8.75	-0.94
5,129.00	75.10	99.80	4,920.96	-114.24	425.86	428.58	10.24	9.39	-4.24
5,160.00	78.00	97.70	4,928.17	-118.83	455.65	458.48	11.44	9.35	-6.77
5,193.00	81.40	95.70	4,934.07	-122.61	487.89	490.80	11.90	10.30	-6.06
5,225.00	84.80	94.40	4,937.91	-125.40	519.53	522.50	11.36	10.63	-4.06
5,257.00	88.50	93.40	4,939.78	-127.58	551.40	554.41	11.98	11.56	-3.13
5,285.00	89.90	92.00	4,940.17	-128.89	579.36	582.40	7.07	5.00	-5.00
5,317.00	90.60	92.00	4,940.04	-130.01	611.34	614.40	2.19	2.19	0.00
5,349.00	90.50	91.50	4,939.73	-130.99	643.33	646.40	1.59	-0.31	-1.56
5,446.00	90.10	91.50	4,939.22	-133.53	740.29	743.39	0.41	-0.41	0.00
5,543.00	90.00	90.60	4,939.14	-135.31	837.27	840.39	0.93	-0.10	-0.93
5,639.00	89.70	90.80	4,939.39	-136.48	933.27	936.38	0.38	-0.31	0.21
5,736.00	89.50	90.30	4,940.06	-137.41	1,030.26	1,033.37	0.56	-0.21	-0.52
5,831.00	89.20	90.30	4,941.14	-137.91	1,125.25	1,128.34	0.32	-0.32	0.00
5,927.00	90.90	91.50	4,941.06	-139.41	1,221.24	1,224.33	2.17	1.77	1.25
6,023.00	91.10	90.80	4,939.38	-141.34	1,317.20	1,320.32	0.76	0.21	-0.73
6,120.00	91.30	90.80	4,937.35	-142.69	1,414.17	1,417.29	0.21	0.21	0.00
6,216.00	90.90	90.70	4,935.51	-143.95	1,510.14	1,513.27	0.43	-0.42	-0.10
6,313.00	90.60	90.60	4,934.24	-145.05	1,607.13	1,610.25	0.33	-0.31	-0.10
6,409.00	90.30	90.10	4,933.48	-145.64	1,703.12	1,706.23	0.61	-0.31	-0.52
6,505.00	90.70	90.00	4,932.65	-145.72	1,799.12	1,802.20	0.43	0.42	-0.10
6,600.00	90.60	90.30	4,931.57	-145.97	1,894.11	1,897.17	0.33	-0.11	0.32

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #931H
Project:	Eddy County, NM	TVD Reference:	KB @ 3647.00usft
Site:	Burch Keely Unit #931H	MD Reference:	KB @ 3647.00usft
Well:	SHL: 820' FNL, 300' FWL, Sec 13, T17S, R29E, Unit D	North Reference:	Grid
Wellbore:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 1	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 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)
6,697.00	92.10	90.50	4,929.28	-146.65	1,991.08	1,994.12	1.56	1.55	0.21
6,793.00	91.70	90.80	4,926.10	-147.74	2,087.02	2,090.06	0.52	-0.42	0.31
6,857.00	91.60	90.20	4,924.26	-148.29	2,150.99	2,154.02	0.95	-0.16	-0.94
6,953.00	91.30	90.10	4,921.83	-148.55	2,246.96	2,249.97	0.33	-0.31	-0.10
7,049.00	91.00	90.20	4,919.90	-148.80	2,342.94	2,345.93	0.33	-0.31	0.10
7,145.00	90.90	90.10	4,918.31	-149.05	2,438.93	2,441.89	0.15	-0.10	-0.10
7,242.00	90.20	90.30	4,917.38	-149.39	2,535.92	2,538.86	0.75	-0.72	0.21
7,338.00	91.70	89.30	4,915.79	-149.05	2,631.91	2,634.81	1.88	1.56	-1.04
7,435.00	91.60	89.80	4,912.99	-148.29	2,728.86	2,731.71	0.53	-0.10	0.52
7,531.00	91.30	89.30	4,910.57	-147.54	2,824.83	2,827.63	0.61	-0.31	-0.52
7,627.00	90.90	89.60	4,908.72	-146.61	2,920.81	2,923.55	0.52	-0.42	0.31
7,723.00	90.80	89.20	4,907.30	-145.61	3,016.79	3,019.48	0.43	-0.10	-0.42
7,820.00	90.50	88.60	4,906.20	-143.75	3,113.76	3,116.38	0.69	-0.31	-0.62
7,916.00	90.20	87.80	4,905.61	-140.73	3,209.71	3,212.23	0.89	-0.31	-0.83
8,013.00	92.40	87.90	4,903.41	-137.09	3,306.62	3,309.01	2.27	2.27	0.10
8,109.00	92.00	87.90	4,899.73	-133.58	3,402.48	3,404.75	0.42	-0.42	0.00
8,206.00	92.10	90.00	4,896.26	-131.80	3,499.40	3,501.60	2.17	0.10	2.16
8,303.00	91.90	89.50	4,892.87	-131.38	3,596.34	3,598.49	0.55	-0.21	-0.52
8,400.00	91.90	90.30	4,889.65	-131.21	3,693.28	3,695.41	0.82	0.00	0.82
8,496.00	91.70	89.70	4,886.64	-131.21	3,789.23	3,791.33	0.66	-0.21	-0.63
8,592.00	91.30	90.70	4,884.13	-131.55	3,885.20	3,887.27	1.12	-0.42	1.04
8,689.00	91.50	90.00	4,881.76	-132.14	3,982.17	3,984.22	0.75	0.21	-0.72
8,785.00	90.80	89.80	4,879.83	-131.97	4,078.15	4,080.17	0.76	-0.73	-0.21
8,882.00	89.70	91.60	4,879.41	-133.16	4,175.13	4,177.16	2.17	-1.13	1.86
8,978.00	89.10	91.20	4,880.41	-135.50	4,271.10	4,273.15	0.75	-0.63	-0.42
9,073.00	89.80	92.70	4,881.32	-138.73	4,366.04	4,368.14	1.74	0.74	1.58
9,169.00	90.10	91.20	4,881.41	-142.00	4,461.98	4,464.13	1.59	0.31	-1.56
9,266.00	90.00	90.40	4,881.32	-143.35	4,558.97	4,561.12	0.83	-0.10	-0.82
9,361.00	91.60	91.60	4,880.00	-145.01	4,653.94	4,656.11	2.11	1.68	1.26
9,458.00	92.00	89.30	4,876.95	-145.77	4,750.88	4,753.04	2.41	0.41	-2.37
9,553.00	91.60	88.80	4,873.96	-144.20	4,845.82	4,847.91	0.67	-0.42	-0.53
9,648.00	91.40	88.90	4,871.48	-142.29	4,940.77	4,942.78	0.24	-0.21	0.11
9,743.00	91.60	88.60	4,868.99	-140.22	5,035.71	5,037.64	0.38	0.21	-0.32
9,839.00	91.80	87.90	4,866.14	-137.29	5,131.63	5,133.45	0.76	0.21	-0.73
9,936.00	91.80	88.00	4,863.10	-133.82	5,228.52	5,230.23	0.10	0.00	0.10
10,032.00	91.70	87.70	4,860.16	-130.22	5,324.40	5,326.00	0.33	-0.10	-0.31
10,096.00	91.60	87.60	4,858.32	-127.60	5,388.32	5,389.83	0.22	-0.16	-0.16
Final MWD Survey									
10,160.00	91.60	87.60	4,856.53	-124.92	5,452.24	5,453.66	0.00	0.00	0.00
Projection to Bit/TD									



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #931H
Project:	Eddy County, NM	TVD Reference:	KB @ 3647.00usft
Site:	Burch Keely Unit #931H	MD Reference:	KB @ 3647.00usft
Well:	SHL: 820' FNL, 300' FWL, Sec 13, T17S, R29E, Unit D	North Reference:	Grid
Wellbore:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 1	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FNL, 477' FWL, Sec 18, T17S, R30E, Lot 1	Database:	EDM 5000.1 Single User Db

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
PBHL (BKU #931H/OH)	0.00	0.00	4,863.62	-156.10	5,476.40	669,066.80	596,994.50	32° 50' 20.227 N	104° 1' 3.122 W
- actual wellpath misses target center by 40.07usft at 10160.00usft MD (4856.53 TVD, -124.92 N, 5452.24 E)									
- Point									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,248.00	4,247.76	-31.96	-4.91	TIE-IN to VES Gyro
10,096.00	4,858.32	-127.60	5,388.32	Final MWD Survey
10,160.00	4,856.53	-124.92	5,452.24	Projection to Bit/TD

Checked By: _____	Approved By: _____	Date: _____
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